

Mayflower Mill and Tailings Impoundments Area Sampling and Analysis Plan

Health and Safety Plan (HASP)

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LIST OF ACRONYMS

COPC	Chemical of Potential Concern
FSP	Field Sampling Plan
GPS	Global Positioning System
HASP	Health and Safety Plan
IDEQ	Idaho Department of Environmental Quality
OSHA	Occupational Health and Safety Association
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedures
SSO	Site Safety Officer
USEPA	United States Environmental Protection Agency
USFS	United States Department of Agriculture Forest Service

1.0 INTRODUCTION

This Health and Safety Plan (HASP) establishes policies and procedures to protect workers from the potential hazards posed by field activities associated with environmental sampling of various media in and around the Mayflower Tailings Impoundments and surrounding area (Site) including the Animas River. The project area is located near Silverton, Colorado (Figure 1).

The HASP assigns personnel responsibilities, prescribes mandatory operating procedures, establishes personal protective equipment (PPE) requirements, and describes actions to be taken during a site emergency. The HASP has been prepared to comply with the requirements of 29 CFR 1910.120 (b)(4) and the requirements of the Environmental Protection Agency (EPA) Occupational Health and Safety Manual. In addition, the EPA Interim Standard Operating Safety Guide will be followed during site activities.

The provisions of this plan are mandatory for all personnel assigned to the project, including all employees of Formation Environmental, and will serve as a guideline for subcontractors and visitors. A copy of this plan will be made available to all personnel, contractors, subcontractors, and authorized visitors that may enter work areas. This plan does not apply to the EPA or State of Colorado personnel or their on-site representatives.

Formation Environmental personnel working at the site must have received the Occupational Safety and Health Administration (OSHA) HAZWOPER training (29 CFR 1910.120(e)(3)) as applicable. HAZWOPER training certificates will be maintained on-site by the Site Health and Safety Officer (SHSO). Those personnel must be involved in the communication and understanding of potential chemical hazards through a Hazard Communication Program in accordance with the provisions of the OSHA Regulations 29 CFR 1910.1200.

This plan also provides for alternative procedures to address changing situations that may arise during field operations. This plan shall be present and readily available during all on-site activities. All personnel working on or visiting work areas shall be briefed on the HASP and adhere to all provisions of this plan. Any supplemental plans used by subcontractors shall conform to this HASP as a minimum.

All project-related personnel on-Site, including contractors, shall be informed of the Site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This HASP summarizes those hazards and defines protective measures.

This plan must be reviewed and an agreement to comply with the requirements must be signed by all personnel prior to performing field work at the Site.

During development of this plan, consideration was given to current safety standards as defined by the EPA, OSHA, and the National Institute of Occupational Safety and Health (NIOSH),

health effects, and standard for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. The following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311;
- OSHA/NIOSH/EPA/United States Coast Guard (USCG) Occupational Health and Safety Guidelines;
- NIOSH Pocket Guide to Chemical Hazards; and
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values.

This plan has been developed using the historical information and the analytical data available. As additional information is collected, this HASP may be updated to reflect new hazard analysis and new health and safety program requirements.

Low: Unknown:

1.1 Site Description

As shown on Figure 2, the study area in the upper Animas River Valley extends along the river and the floodplain from just upstream of the confluence of the upper Animas River and Arrastra Creek downstream to the 14th Street bridge crossing in Silverton.

There are four Mayflower Tailings Impoundments and they are located approximately one mile to the northeast and upstream of Silverton on the right bank of the Animas River. Tailings Impoundment No. 1 is the most upstream, and subsequent impoundments are numbered in the downstream direction. The tailings in the impoundments were generated by flotation milling of gold/silver ore at the Mayflower Mill, located just northeast of Tailings Impoundment No. 1 (Figure 2). The ore was extracted from the Sunnyside Mine, which was most recently accessed by a haulage tunnel in the Cement Creek basin to the north of Silverton. The Sunnyside Mine and the Mayflower Mill ceased operation in 1991. The Mayflower Tailings Impoundments were reclaimed in the early 1990s by re-grading the side slopes, if required, to achieve a stable configuration and by covering the slopes and top surfaces with locally derived soil and rock. Presently the impoundments are dry and support a sparse vegetative cover.

Extensive historic mining and milling activity occurred throughout the upper Animas River basin over the past 150 years, including areas upstream of the Mayflower Tailings Impoundments. Discharging mine adits and historic mine waste rock piles are present at numerous locations, and historic mills typically discharged tailings to the Animas and its tributaries. As a result of the historic mining and milling activities, concentrations of metals such as aluminum, cadmium, iron, manganese, and zinc have historically exceeded their respective Colorado water quality

standards for reach of the Animas River that is within and outside of the study area. Elevated metals concentrations in the Animas River have been documented to occur in the vicinity of the Mayflower Tailings Impoundments.

1.2 Project Description

Formation is performing investigational sampling within the Study Area. Field activities associated with the sampling will include field measurements of stream flow, drilling and monitoring well construction, groundwater level measurements, and the collection of groundwater, surface water, pore water, sediment, and other solid phase media (e.g., soil, mine waste, mineralized rock) samples laboratory analysis.

1.3 Plan Revisions

The procedures presented herein are intended to serve as guidelines. They are not a substitute for the sound judgment of on-site personnel. Work conditions may change as the project progresses. As appropriate, the plan will be modified by the Project Manager and reissued. Prompt notification of changing work conditions requiring possible modification of this plan is the responsibility of the Project Manager. Additional field tasks with unique hazards or risks may also require changes to this plan. In addition, procedures and equipment specified in this plan will be reviewed and updated as new technologies and equipment are developed. In any event, no changes to this plan will be implemented without prior approval of the Project Manager.

HASP Attachment 1 will be reserved for HASP addenda. The addenda will be identified by letter and will refer to the latest current revision of the plan (e.g., the first addendum to this plan will be Addendum 1A). Each person with a copy of this plan will be provided with each addendum. A list of those persons who have a copy of this plan will be kept by the Field Supervisor.

2.0 KEY PERSONNEL

The names and contact information of key project personnel are shown in Table 1. The primary points of contact for health and safety incidents include the personnel from Formation Environmental followed by the secondary contacts to Sunnyside Gold. Within Formation Environmental, the field supervisor/health and safety officer will notify the project manager and additional secondary notifications will be made to the Sunnyside Gold personnel listed below.

Table 1: Key Project Personnel

Key Personnel	Name	Affiliation	Work Phone	Other Phone
Project Manager	Brian Hansen	Formation Environmental	303-442-0267	720-635-6911
Field Supervisor	Patrick Lennberg/Nat Beal	Formation Environmental	303-442-0267	512-659-2990
Health and Safety Officer	Patrick Lennberg/Nat Beal	Formation Environmental	303-442-0267	512-659-2990
Program Manager	Pat Maley	Sunnyside Gold		
Sunnyside Field Representative	Terry Turner	Sunnyside Gold		
Technical Lead	Linda Schmoll	Sunnyside Gold		

2.1 Project Manager

The Project Manager will coordinate all Site activities for the project. The Project Manager will have the responsibility to interface with any regulatory agency personnel and to ensure that appropriate reporting occurs.

The Project Manager's responsibilities include the following:

- Overseeing project implementation;
- Decisions of changes to the HASP; and
- Coordinating with the Field Supervisor and Health and Safety Officer on project health and safety requirements.

2.2 Field Supervisor

The Field Supervisor will be designated as the person responsible for oversight of the project implementation, including all health and safety activities. The Field Supervisor will have the responsibility for implementation of the HASP during actual field operations. His responsibilities include the following:

- Conducting the pre-entry briefing with field personnel;
- Informing personnel involved in the field operations of the proper procedures during emergencies;
- Immediately reporting any unusual or unsafe conditions to the Project Manager;
- Verifying that all employees under his or her leadership work in a safe manner according to Sunnyside policies and this HASP;
- Providing a copy of the HASP to all contractors, and informing them or their representatives of any potential safety hazards that exist on-Site or that may be identified during normal operations;
- Observing work party members for symptoms of overexposure or stress;
- Conducting daily tailgate safety meetings;
- Performing Site audits to verify adherence to the requirements of the HASP; and
- Modifying health and safety equipment or procedures based on data gathered at the worksite.

2.3 Health and Safety Officer

The Health and Safety Officer will be supervising for all health and safety activities during the project implementation. The Health and Safety Officer will report directly to the Field Supervisor when sampling activities are occurring if these roles are not undertaken by the same person. Specific responsibilities include:

- Participating in the preparation of and implementation of this HASP;
- Conducting initial briefings for personnel beginning work at the Site. Personnel will supply copies of all training, medical surveillance, and fit testing documentation. Such documentation will be reviewed and maintained by the Health and Safety Officer;
- Available for daily tailgate safety meetings (meetings will be documented [attendees and safety issues discussed] and documentation maintained on-Site). The Daily Pre-Work/Job Site Assessment form is provided as HASP Attachment 2;
- Informing personnel involved in the field operations of the proper procedures during emergencies;
- Ensuring that personnel involved in this project are aware of the provisions of this HASP;
- Informing and reminding personnel of the potential hazards associated with this project;
- Ensuring that field personnel receive Site-specific training the first day on-Site;
- Selecting appropriate protective clothing and equipment;
- Monitoring on-Site intrusive operations and conditions;
- Immediately reporting any unusual or unsafe conditions to the Field Supervisor;
- Coordinating emergency procedures, evacuation routes, and calling the appropriate emergency contacts; and

- Approving this plan and making any updates or changes based on experience at the Site or new data gathered.

2.4 Project Staff Responsibilities

Specific responsibilities for all field personnel involved with the project include:

- Complying with the plan;
- Administering necessary precautions to minimize injury or chemical exposure to themselves or other personnel; and
- Notifying the Field Supervisor or Health and Safety Officer of unsafe or potentially unsafe conditions, as well as of any accidents or injuries.

2.5 Contractors

Contractors and third party contractors shall bear the ultimate responsibility for all matters dealing with safety in the performance of their work. This responsibility includes the safety of all persons and property and any and all employees of contractors that may perform work on their behalf. This requirement will apply continuously regardless of time or place, and will in no way be altered because Formation Environmental personnel provide general directions as to the location where work should be performed and/or samples taken. A copy of the minimum requirements for contractors at the site can be found in Attachment 6. The contractor, their employees and any and all employees of subcontractors that may perform work on their behalf may be required to work with potentially hazardous substances. The Health and Safety Officer will, to the best of his or her ability, inform contractors or their representatives of any potential electrical, fire, explosion, health, or other safety hazards that have been identified during operations. A copy of this HASP shall be made available to all contractors performing project-related work at the Site. Copies of contractors HASPs for Cascade Drilling and Golder Associates are provided in Attachments 7 and 8 respectively.

3.0 HAZARD EVALUATION

The major goal of the procedures defined in this HASP is to protect the workers from physical and chemical hazards that may be encountered during implementation of the work. The sections below discuss the hazards that could potentially be encountered during the course of the project. A Job Safety Analysis (JSA) document is provided in HASP Attachment 3. While the attached JSA is specific to work performed in and around streams, ponds, and lakes, the hazards and safe job procedures apply to other environmental monitoring work as well.

3.1 Task Risk Analysis

The following describe specific hazards associated with planned site activities. The protective measures to be implemented during completion of those operations are also identified under Section 5, Personal Protective Equipment.

3.1.1 Surface Water, Pore Water and Sediment Sampling

Field activities on or near ponds, fast-moving streams, or other surface waters pose a potential drowning hazard. The hazard is addressed in 29 CFR 1926.106: "Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard-approved life jackets or buoyant work vests." Workers working over water in boats will be required to don a life vest. Workers working near water will not be required to wear life vests; however, life vests will be available within 50 feet of the work activity. Procedures specified in the JSA (see HASP Attachment 3) will be followed for work in and around water.

3.1.2 Drilling

All the safety provisions of normal site operations should be followed.

- Use all of the following means to locate underground utilities prior to any drilling: (1) Underground Service Alert (USA); (2) site maps and drawings (when available); (3) private utility locators (unless utility location services are provided by others); (4) site markings and conditions; (5) hand-probing or excavating to a depth of at least 4 feet; and (6) site personnel familiar with the history of site usage (when available). Be especially wary of electrical, natural gas, and product lines. NEVER rely solely on site drawings or site personnel to determine the exact location of buried utilities.
- Observe safe distances from overhead utilities of at least 10 feet. In accordance with OSHA requirements, greater distances are required for overhead lines carrying greater than 50,000 volts. Greater distance should also be maintained if there is a risk that stray or broken (snapped) cables could come into contact with electrical lines
- At sites where non-project personnel may be present, properly demarcate the area to be excavated with barricades, fencing, and/or flagging. When appropriate, post warning and "No Smoking" signs conspicuously, and enforce them.

- Fire extinguishers (at least one, 10-lb. ABC) must be on site and readily accessible at all times.
- All drilling locations should be verified and marked by an authorized person.
- Locate emergency shut-off valves and switches (kill switch), and (if present) confirm that the drilling crew knows where they are and how to use them.
- Drill rig must be properly grounded at all times.
- Observe proper lifting techniques when transporting core samples to be lithologically logged and samples collected.
- Drilling should stop if any of the following conditions are encountered: (1) levels of contamination that are significantly higher than those contemplated in the Site Health and Safety Plan; (2) unknown substances that are not contemplated in the Site Health and Safety Plan; ; or (3) utility lines. In such instances, all operations will stop until the situation is evaluated with the Field Supervisor and the Project Manager has been notified. All drilling and sampling equipment should be left in the ground, equipment should be turned off, and cuttings and samples should be containerized, if necessary.

3.1.3 Monitoring Well Installation and Maintenance

- Wear appropriate personal protective equipment during installation or maintenance activities.
- Precautions should be taken to avoid trip, slip, and fall accidents when walking or climbing on irregular or slippery surfaces. When changing locations, the area will be visually surveyed for slippery surfaces and tripping hazards. If it becomes necessary to perform work on the drill mast, the mast will be lowered prior to performing work. If the mast cannot be lowered then personnel working on the mast will have an OSHA approved safety harness and use it to avoid any falls from height.
- Field personnel will avoid placing body parts at points of operation and/or pinch points. Legs should be used to lift heavy objects, avoiding awkward positions and twisting of the body. Assistance should be requested for awkward or heavy loads.
- Working with drill rigs can result in injuries from equipment dislodging and striking unsuspecting personnel, and from impacts due to flying objects or overturning vehicles. Therefore, follow these precautions:
 - Drill rig will be inspected visually before each use. Routine inspections of drill rig throughout shall include brakes, hydraulic lines, fire extinguishers, fluid levels, tires, treads, horns, and other safety devices. If inspection reveals unsafe conditions, rig will be removed from service and repaired.

- Operator and other personnel in area during lifting of tools onto rig mast shall position themselves so that they are not under the load, between equipment, or in areas where lifted items could fall.
- Be careful when opening wells, pipes, or valves that may have become pressurized. Vent off the pressure if possible, or provide shielding to avoid splashing of materials. Keep face away from well heads. Be careful when opening well covers. Watch for spiders, wasps and other insects.

3.1.4 Groundwater Sampling and Aquifer Testing

- During groundwater sampling activities, wear the appropriate protective gear for the operation.
- Be careful when opening wells, pipes, or valves that may have become pressurized. Vent off the pressure if possible, or provide shielding to avoid splashing of materials. Keep face away from well heads. Be careful when opening well covers. Watch for spiders, wasps and other insects. Exercise caution when opening or handling sampling containers containing acid (hydrochloric, nitric, sulfuric) preservatives. Do not allow sampling containers containing acid to sit in the sun. Warmed acids may fume when the containers are opened causing irritation to the eyes, nose and throat.

3.1.5 Solid Phase Media Sampling

- During solid phase media sampling (e.g., soil, mine waste, and mineralized rock) activities wear the appropriate protective gear for the operation.
- Make sure others on site (especially equipment operators) know where you are and that you maintain line-of-sight contact. During collection of soil samples, minimize contact with soil with your clothing and body.

3.2 Physical Hazards

The following describes the various potential physical hazards in the Study Area that may be encountered during the planned field work. Injuries that may result from these physical hazards can range from simple slip-trip-fall types of accidents to casualties, including fatalities due to moving heavy equipment or electrocution. Injuries resulting from physical hazards can be avoided through the adoption of safe work practices and employing caution when working with or near machinery. Never put your hands near moving equipment (e.g., cables, pulleys, or automated hammers).

Additional physical hazards associated with hard rock mine features are, but not limited to, the presence of steep slopes, high walls, and the operation of heavy equipment. Work should be avoided, to the extent possible, in areas where these hazards may exist. In addition, work will be conducted in the vicinity of cold, fast-moving streams. Project personnel should only enter such streams for the purposes of discharge measurements or sampling with the appropriate

PPE and safety equipment. Project personnel may decline to enter such streams if they deem conditions to be unsafe.

At the start of each day, the Field Supervisor shall inform the Project Manager of the locations and nature of the planned work. All field personnel shall be conscious of their work environment and should notify the Field Supervisor or other appropriate supervisory personnel of any unsafe conditions. The Field Supervisor will be responsible for informing all workers of any physical hazards related to the Site. All field personnel should also familiarize themselves with other contractors' safety procedures. The protective measures to be implemented during completion of field activities are also identified under Section 5, Personal Protective Equipment (PPE).

3.2.1 Heavy Equipment

Operation of heavy equipment (drilling rigs, graders, compactors, trucks, and dozers) presents a potential physical hazard to personnel. All PPE must meet or exceed the relevant standards set by NIOSH (National Institute for Occupational Safety and Health), ASTM (American Society for Testing and Materials), or ANSI (American National Standards Institute) for safety hard-toed boots, safety glasses or safety sunglasses, and hard hats, all of which should be worn whenever such equipment is present. Personnel should at all times be aware of the location and operation of heavy equipment, and take precautions to avoid getting in the way of their operation. High visibility vests may be appropriate in open areas subject to heavy equipment traffic. When approaching the operator of any heavy equipment, be sure to make and maintain a clear line-of-sight contact.

3.2.2 Trenching/Excavation

Trenches and excavations may pose a physical hazard to Site personnel during the collection of samples for geotechnical and/or laboratory analysis or other field work activities. All trenching and excavation work shall comply with the requirements of 29 CFR 1926, Subpart P. No worker shall enter an excavation without ensuring that the excavation and procedures comply with 29 CFR 1926. The contractor shall train any personnel that may enter an excavation in safe practices. Some requirements for safe trenching are:

- Whenever possible workers will not go into trenches or excavations.
- Any excavations and/or trenches exceeding five (5) feet in depth and in which personnel may be entering must be sloped, shored, braced or otherwise supported. Sloping angles and/or shoring/bracing requirements shall be determined after an inspection of the soils and conditions by a competent individual. The water content of the soil, the soil type, the degree of compaction, superimposed loads and vibration can affect the stability of a trench excavation. Support systems shall be planned and designed by a qualified person.
- Excavations and trenches will be inspected by a competent person before workers enter them. Furthermore, daily inspections shall be made and trenches shall be reinspected after every rainstorm or other hazard-increasing event.

- Excavated materials (spoils) shall be stored at least two feet or more from the edge of the excavation, or otherwise retained, in order to prevent this material from falling into the excavation.
- When employees are required to be in trenches four feet deep or more, an adequate means of exit, such as a ladder or steps, will be provided and located no more than 25 feet from any work area.

3.2.3 Cold Stress

Personnel working outdoors in low temperatures, especially at or below 40° Fahrenheit (F), wet conditions, wind speed 5 miles per hour or higher, lack of water, previous cold injuries, use of tobacco, fatigue and low activity are subject to cold stress. Exposure to extreme cold for a short time causes severe injury to the surface of the body. Areas of the body which have high surface area-to-volume ratio such as fingers, toes, feet and ears are the most susceptible.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. A wind chill chart is shown in HASP Attachment 4.

Frostbite

Local injury resulting from cold is included in the generic term frostbite. Frostbite of the extremities can be categorized as:

- "Frost nip or incipient frostbite" which is characterized by sudden whitening of skin;
- "Superficial frostbite" which is characterized by skin with a waxy or white appearance and is firm to the touch, but tissue beneath is resilient; and
- "Deep frostbite" which is characterized by tissues that are cold, pale, and solid.

Hypothermia

Hypothermia is most likely at very cold temperatures but it can occur even at cool temperatures if an individual becomes chilled from rain or sweat. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering, exhaustion;
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95° F;
- Unconsciousness, glassy stare, slow pulse, and respiratory rate;
- Freezing of the extremities; and
- Death.

Field activities shall be terminated by the Health and Safety Officer or Field Supervisor if initial signs of frostbite or hypothermia exist and activities may be terminated if equivalent wind chill temperature is below 0° F. All affected personnel shall be kept warm and receive immediate medical care.

Additional notes to remember:

- Do not rub the frostbitten part;
- Do not use ice, snow, gasoline or anything cold on the frostbitten area;
- Do not use heat lamps or hot water bottles to rewarm the part; and
- Give a warm drink - not coffee, tea, or alcohol.

3.2.4 Heat Stress

When personnel are working in hot environments, the Field Supervisor and all field personnel should be trained to recognize the symptoms of heat stress and provide initial first aid treatment if required until more qualified personnel take over. Heat stress occurs when the rate of heat gain is greater than the body's ability to remove it. It is important to understand the factors that cause overheating and mechanisms to control those factors. A heat stress education poster is included as HASP Attachment 5.

Heating of the body occurs from three sources:

- Radiant heating from heat sources or sunlight;
- Convective heating from contact with a warmer object or liquid; and
- Metabolic heating caused by activity.

Cooling occurs through three mechanisms:

- Respiration: Exhaled air is warm. As the body overheats, respiration becomes more rapid;
- Radiation: Heat is released at the surface of the skin. As the body overheats, the superficial blood vessels dilate and allow more heat to be lost; and
- Evaporation: Perspiration is released to the skin surface and evaporates. The skin is cooled by evaporative cooling.

Employee Education

Heat stress symptoms and treatment are described in Table 2

Table 2: Heat Stress Symptoms and Treatment

CONDITION	COMMON SYMPTOMS	TREATMENT
Slightly elevated body temperature	Body temperature between 99 and 101° F Headache	Drink cool fluids. Rest in cool place until temperature and pulse are below 99° F and 110 beats per minute respectively.
Heat rash	Rash mainly on back	Shower at the end of the shift. Observe for signs of heat exhaustion.
Heat cramps	Muscle cramps or twitching often starting in abdominal area. Pain in hands, feet and abdominal areas.	Remove from field work. Take off PPE. Encourage consumption of cool fluids designed to replenish electrolytes (e.g., Gatorade). Observe for signs of heat exhaustion.
Heat exhaustion	Body temperature between 99 and 102° F Headache, weakness Elevated pulse Profuse sweating Pale skin Cool wet/clammy skin Lethargic Nausea Dizziness	Act immediately. Remove to a cool shaded area. Take off PPE. Drink cool fluids, about a cup every 15 minutes unless sick to the stomach. Spray with a cool mist of water or apply wet cloth to skin. Treat as a medical emergency if the person does not feel better in a few minutes. No field work for at least 48 hours.
Heat stroke LIFE THREATENING	Temperature greater than 102° F Hot, dry pale skin with no sweating Flushed skin Irritability, confusion, seizures, unconsciousness. Rapid pulse	Treat as a medical emergency. Remove from field work. Remove PPE. Spray with a cool water mist, or apply cool wet cloth to skin, not cold water. Place ice packs under armpits and groin area until emergency medical services arrive. Written release from doctor required to return to work.

Effects of PPE

Heat stress may occur with or without the use of PPE. PPE adds layers of clothing that insulate the wearer from cooling air. Chemical protective clothing generally has a vapor barrier to keep out chemical vapors. The vapor barrier also prevents evaporative cooling of perspiration. In short, PPE increases the heat stress on workers.

Practical Methods to Reduce Heat Stress

These methods will be discussed during safety meetings:

- Become acclimated to heat for several days whenever possible. Plan work in the cooler portions of the day. Early morning hours and evening hours are cooler.

- Perform Site preparations before the field team dresses out. Instrument calibrations, equipment preparation, and planning for the work day, etc., should be performed before dressing in PPE.
- Take frequent breaks and consume at least one pint of cool fluid every hour. Replenish electrolytes through the consumption of diluted drinks. The body loses more water than electrolytes. Concentrated salt, electrolyte, or juices can increase susceptibility to heat stress.
- Avoid beverages with caffeine, which make the body lose water and increase risk for heat illnesses.

Occupational Exposure Standards

The EPA and the ACGIH have published heat stress monitoring recommendations. The EPA recommends heat-stress monitoring at temperatures above 70° F when chemical PPE is used.

The tabulated information assumes that no chemical PPE is being worn. Since chemical PPE tends to increase heat stress, ACGIH has published correction factors in the same standard. OSHA enforces the ACGIH recommendation.

3.2.5 Ultraviolet (UV) Radiation (sun exposure)

Health effects regarding UV radiation are confined to the skin and eyes. Overexposure can result in many skin conditions, including erythema (redness or sunburn), photoallergy (skin rash), phototoxicity (extreme sunburn acquired during short exposures to UV radiation while on certain medications), premature skin aging, and numerous types of skin cancer.

Acute overexposure of UV radiation to the eyes may lead to photokeratitis (inflammation of the cornea), also known as snow blindness. Symptoms include redness of the eyes and a gritty feeling, which progresses to pain and an inability to tolerate any kind of light. This condition can also occur when working in or around water and other UV radiation reflectors. In addition, long-term exposure to sunlight is thought to cause cataracts or clouding of the lens of the eye.

Limit Exposure Time

- If possible rotate staff so the same personnel are not exposed all of the time.
- Try and limit exposure time when UV radiation is at peak levels (approximately 2 hours before and after the sun is at its highest point in the sky).
- Avoid exposure to the sun, or take extra precautions when the UV index rating is high.

Provide Shade

- Try and take lunch and breaks in shaded areas.
- If possible create shade or shelter through the use of umbrellas, tents, and canopies.

- Use fabrics such as canvas, sailcloth, awning material and synthetic shade cloth that create good UV radiation protection.
- Check the UV protection of the materials before buying them. Seek protection levels of 95 percent or greater, and check the protection levels for different colors.

Clothing

- Reduce UV radiation damage by wearing proper clothing; for example, long sleeved shirts with collars, and long pants. The fabric should be closely woven and should not let light through.
- Head protection should be worn to protect the face, ears, and neck. Wide-brimmed hats with a neck flap or "Foreign Legion" style caps offer added protection.
- Wear UV-protective sunglasses or safety glasses. These should fit closely to the face. Wrap-around style glasses provide the best protection.

Sunscreen

- Apply sunscreen generously to all exposed skin surfaces at least 20 minutes before exposure, allowing time for it to adhere to the skin.
- Re-apply sunscreen at least every 2 hours, and more frequently when sweating or performing activities where sunscreen may be wiped off.
- Choose a sunscreen with a high sun protection factor (SPF). Most dermatologists advocate SPF 30 or higher for significant sun exposure.
- Select waterproof sunscreens for use in or near water, and by those who perspire sufficiently to wash off non-waterproof products.
- Check for expiration dates, because most sunscreens are only good for about 3 years.
- Store in a cool place out of the sun.
- Remember that no sunscreen provides 100% protection against UV radiation. Other precautions must be taken to avoid overexposure.

3.2.6 Altitude Sickness

Safety at altitude depends on common sense. This dictates that project personnel - especially newcomers - should acclimatize cautiously and not proceed to higher altitudes if feeling unwell. Project personnel should be familiar with the symptoms of serious altitude sickness, monitor the condition of fellow workers, and know what action to take if a problem arises. All personnel should be aware that altitude can affect the judgment of individuals, sometimes dangerously.

Minor Symptoms

- Mild shortness of breath;
- Dizziness;
- Lightheadedness;
- Headaches;
- A change in visual activity;
- Palpitations;
- Chest tightness;
- Nausea.

Major Symptoms

- Shortness of breath;
- Sudden onset of severe unrelenting headaches;
- Chest pain;
- Abdominal pain.

Major Signs

- Slurred speech;
- Visual disturbance;
- Loss of coordination;
- Paralysis;
- Seizures;
- Collapse;
- Slow or rapid heartbeat;
- Labored breathing;
- Unrelenting nausea or vomiting.

Corrective Action

Treatment for mild symptoms includes rest, increased fluid intake, and small, high-carbohydrate meals. For more extreme symptoms, the person should descend to lower altitude and seek medical help.

Prevention

To reduce your chances of experiencing symptoms of altitude sickness, try the following:

- Reduce alcohol, caffeine and salty food consumption for two days prior to ascent.
- Drink three to four times more water than usual.
- Get plenty of rest before and during your stay at high altitude.
- Don't overexert yourself. Your heart works harder at higher altitudes, so quit when you get tired.
- Wear sunscreen. You get 30 percent more ultraviolet radiation in high altitudes than you do at sea level.
- Eat high-carbohydrate meals, limiting fat and protein, for the first few days at high altitude.
- Take your time ascending. Those who will spend more than one day at a higher altitude, or those who plan strenuous activity at a high altitude, should spend one day acclimating.

3.2.7 Weather

It is a Formation Environmental policy that field work be conducted under safe conditions. Rain, snow and/or high wind conditions may occur during the time period of a scheduled work activity.

Protective clothing for wet conditions will be utilized as necessary. Heavy rains, high winds or other weather conditions may result in the cessation of Site activities, at the discretion of the Project Manager or Field Supervisor.

Outdoor operations will be suspended when lightning is within a 15 second count of the Site (i.e., the time difference between seeing a lightning strike and hearing the sound). High profile equipment operation, such as drill rigs, shall be suspended when lightning is within 30 seconds of the Site. Equipment operators shall stop their equipment and park it safely before heading for shelter. No personnel will be left on the ground in an exposed location. Preferred shelter during thunderstorms is a permanent building. Personnel may also take shelter in trailers or low profile rubber tired equipment (e.g., pickups). Avoid driving pickups or any other equipment, except to help evacuate personnel.

Thunderstorms always have the potential for down bursts and hail. Weather forecasts should be monitored frequently for changing weather conditions. Work may resume after a 30 minute period without lightning occurring within the 15 or 30 second count specified.

The Field Supervisor will ensure that a dedicated watch is posted during periods of tornado watch or warning. Personnel will be evacuated to permanent structure when necessary. During tornado warnings, refuge should be sought in buildings under archways, tables or in closets below ground level or on the main floors. If the tornado is too close to evacuate to a permanent structure, refuge should be sought in low areas such as ditches.

Extra care must be taken by Site workers during snowy weather. Adequate protective clothing must be donned. Site workers must be allowed rest periods in warm shelters at regular intervals. Vehicle speeds on Site will be limited to below 10 mph during snowy conditions. All work shall be suspended under blizzard conditions and Site workers shall immediately seek warm, sturdy shelters, such as buildings.

3.2.8 Noise

Personnel working around large construction equipment and loud, congested areas can be exposed to excessive noise causing temporary or permanent damage to hearing. The effects of noise can include:

- workers being startled, annoyed, or distracted;
- physical damage to the ear; and
- impediment to communication that may increase potential hazards.

All personnel shall wear hearing-protective devices (i.e., either ear plugs or muffs) when noise levels interfere with normal speech. Hand signals will be established by on-Site personnel, as appropriate, to facilitate communications while involved in high-noise activities.

3.2.9 Dangerous Animals, Insects, and Plants

The Mayflower Tailings Impoundments are in a high-altitude, mountainous setting. In warm months, workers must be prepared for mosquitoes, ticks, chiggers, yellow jackets and other insects, and for snakes. At the end of the workday, workers should check their legs and scalp for ticks or other insects.

Animal bites and insect stings are usually nuisances (i.e., localized swelling, itching, and minor pain) that can be handled with first-aid treatments. The bites of certain snakes and spiders contain sufficient poison to warrant medical attention. There are diseases that can be transmitted by insect and animal bites. Examples are Lyme disease (tick), rabies (mainly dogs, skunks and foxes), malaria, and equine encephalitis (mosquito). The greatest hazard and most common cause of fatalities from animal bites, particularly from bees, wasps, and spiders, is a sensitivity reaction. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous systems, which can also result in death.

The project Site is located in geographic area where Lyme disease and rabies are possible. Lyme disease is spread primarily by a very small tick – the deer tick. It can be found near wooded areas, tall grass and brush. Although the disease is rarely fatal, it can cause flu-like symptoms, arthritis, heart arrhythmias, facial palsy, severe headaches, and loss of sensation. Protection against the tick consists of wearing clothing that covers the whole body, tucking pant legs into boots or socks and tucking a long-sleeve shirt into pants. A white Tyvek is recommended for protection. Use of repellents containing DEET is also effective. It is also

important to frequently check for the ticks, which are about the size of a period on this page. Some warning signs include a “bull’s eye” rash that may appear days to weeks after the bite, flu-like symptoms, swelling and pain in joints and, less common, heart arrhythmia, weakness in legs, facial paralysis and numbness. If employees feel they may have contracted the disease, they must notify the Health and Safety Officer.

The most dangerous toxic effects from plants are due to ingestion of nuts, fruits, or leaves. Consequently, personnel are prohibited from eating any fruits, nuts, or other plant material, which may grow on the Site. Of more concern to response personnel are certain plants including poison ivy, poison oak, and poison sumac, which produce adverse effects from direct contact. The usual effect is dermatitis, an inflammation of the skin. The protective clothing and decontamination procedures used for chemicals reduce the exposure risk to the plant toxins. Cleaning the skin thoroughly with soap and warm water immediately after contact will reduce risk.

3.2.10 Manual Lifting

Activities may require personnel to move large, heavy objects by hand. The human body is subject to severe damage in the forms of back injury and hernia if caution is not observed when handling, lifting, or moving large heavy objects.

General Rules:

- Get a good footing;
- Place feet about one shoulder width apart;
- Bend at knees to grasp weight;
- Keep the back straight; and
- Get a good hold.

3.2.11 Slip, Trip, and Fall Hazards

Protection from slip, trip and fall hazards will be provided through standard safety procedures including good housekeeping. Removing equipment and debris, and taking general precautions during Site operations will be standard operating procedures. Workers will be apprised of any potential trip hazards through regularly scheduled health and safety meetings. Whenever possible, trip and fall hazards will be eliminated or clearly identified with yellow “caution” tape. Impalement hazards to workers will be neutralized as soon as they are identified.

3.2.12 Overhead Utilities

Before Site activities begin, all overhead utilities will be identified and field verified. As necessary, utilities will be deactivated, or operational procedures and project logistics will be established to avoid overhead lines. This will be the responsibility of the Field Supervisor. The

contractor(s) will be responsible for operation of equipment in a safe manner and follow the relevant regulations of 29 CFR 1926.952. These regulations include, but are not limited to:

- All electrical equipment shall be de-energized;
- Assume that all overhead lines are energized unless de-energized by the person owning the line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- No hoisted loads shall be left unattended.

These regulations require all operating equipment maintain minimum safe operating distances from overhead power transmission lines as given in 29 CFR 1926.950 (Table 3).

Table 3: Minimum Safe Working Distances (Alternating Current)

Voltage Range (phase to phase) (kilovolt)	Minimum Working and Clear Hot Stick Distance (Stick Distance)
2.1 to 15	2 feet 0 inches
15.1 to 35	2 feet 4 inches
35.1 to 46	2 feet 6 inches
46.1 to 72.5	3 feet 0 inches
72.6 to 121	3 feet 4 inches
138 to 145	3 feet 6 inches
161 to 169	3 feet 8 inches
230 to 242	5 feet 0 inches
345 to 363	7 feet 0 inches ¹
500 to 552	11 feet 0 inches ¹
700 to 765	15 feet 0 inches ¹

The deactivation of utilities, when necessary, should be certified by the proper utility company personnel and the certification record retained.

3.2.13 Underground Utilities

Before excavation activities begin, all utilities (i.e., electricity, natural gas lines, water lines, sewer lines, etc.) should be identified and deactivated as needed. The location of field work should be adjusted to avoid active underground utilities, if possible. The deactivation of utilities, when necessary, should be certified by the proper utility company personnel and the certification record retained. Location of the utilities and any deactivation will be the responsibility of the Field Supervisor.

3.2.14 Fire Prevention

Fire extinguishers shall be provided in the field vehicle and shall be available on-Site. All extinguishers will be inspected, serviced, and maintained. Inspections shall be recorded on the inspection tag attached to each extinguisher.

3.2.15 Traffic

Vehicle traffic will maintain a safe speed while operating on Site. Occupants of any vehicle shall wear seatbelts at all times. Vehicles and equipment will be equipped with the safety procedures outlined in 30 CFR Subparts H and M and, as applicable, 29 CFR 1926.601. Precautions will be made to warn foot traffic or other vehicles as necessary.

3.3 Chemical Hazards

Potential chemical hazards related to field sampling activities are relatively minor. The data collection activities will include sampling of both surface water and groundwater, soil, and possibly vegetation, and biota that may contain elevated concentrations of metals. Hazards can be minimized through practicing good hygiene and through protection from PPE. For example, protection against skin and eye contact may be provided by:

- Wearing protective equipment (i.e., nitrile or latex gloves);
- Wearing protective safety glasses or goggles;
- Keeping hands away from the face; and
- Minimizing contact with liquid and solid chemicals.

Inadvertent ingestion can occur as a result of personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics. These practices may provide a route of entry for chemicals and are restricted.

Other contaminants may be encountered during the course of the Site activities. If unusual odors or conditions are encountered, personnel should suspend work activities and contact the Field Supervisor for guidance before proceeding.

3.3.1 General Precautions

If signs of contamination different from those addressed in this HASP are encountered, such as visible soil stains or unusual odors, stop all work in the area, barricade or otherwise isolate the area, and immediately contact the Project Manager. Protection of worker health and safety shall be the first priority. Continuation of work in the area and the amount of additional personal protective equipment, if any, shall be determined by the Project Manager. Other precautions to be undertaken to provide a safe work place on this project where the potential for chemical exposure may exist include:

- No smoking, eating, or drinking in areas where contaminants may be present.

4.0 PERSONNEL TRAINING REQUIREMENTS

Prior to initiation of Site activities, all Formation Environmental field personnel shall have completed a 40 hour Hazardous Materials Health and Safety Course and 8-hour annual refresher course(s), as appropriate. All field personnel shall have a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor.

Compliance with sample collection Standard Operating Procedures (SOPs), as provided in the Field Sampling Plan, is required for all personnel performing assigned tasks. In addition, as applicable, JSA (Job Safety Analysis) documents (see HASP Attachment 3) are a tool to help workers identify potential hazards and safe work practices to address those hazards, thereby, avoiding accidents.

The Field Supervisor shall have completed at least eight additional hours of specialized supervisor training as per 29 CFR 1910.120 (e)(4). All courses shall have been conducted by a qualified trainer as specified in 29 CFR 1910.120 (e)(5). These courses should cover chemical hazards, hazard recognition, hazard assessment and personal protective equipment. If necessary, the Site Health and Safety Officer will have been trained in standard first aid measures and CPR.

All personnel who may participate in the Site activities shall be required to have completed appropriate training as specified in 29 CFR 1910.120 (e)(3). The supervisor-training requirement may also apply to the contractor supervisors. If needed, the contractor shall provide copies of written certificates documenting said training. Copies of training certificates for on-site personnel will be kept at the Site in the possession of the Field Supervisor.

Prior to the initiation of each phase of field work, all personnel and contractors who will participate in the work shall attend a pre-entry briefing. The pre-entry briefing will review information contained in this HASP, including:

- Names of personnel responsible for Site safety and health;
- Safety and health concerns, including physical and chemical hazards present at the Site;
- Use of personal protective equipment;
- Work practices by which the employee can minimize risks from hazards;
- Engineering controls and safe use of equipment on Site;
- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- Site control measures;
- Site decontamination procedures;
- Emergency response procedures; and

- Spill containment procedures.

In addition, all persons participating in field activities shall be required to read this HASP. Information discussed at the pre-entry briefing will be reinforced, in turn, during tailgate safety meetings (see below). Additional pre-entry briefings may be required for additional phases of work or if new personnel are assigned to the project.

Tailgate safety meetings will be conducted as necessary, or whenever new personnel arrive and/or when a unique work assignment warrants employee training. Tailgate safety meetings will be conducted by the Field Supervisor. These meetings will cover the projected work for the day or the specific task and will review and reinforce good safe work practices (e.g., proper protective clothing, effective deterrents of heat stress, etc.). Information discussed at the tailgate safety meetings may be revised and updated, based on any new data obtained pertaining to Site characterization and analyses. The Daily Pre-Work/Job Site Assessment form is provided as HASP Attachment 2.

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 Personal Protective Equipment Levels

The following sections describe the various levels of personal protection for field work at the Site. These levels are based upon the encountered and observed physical and chemical hazards at the Site, and previous experience at similar locations with similar chemicals of potential concern. It is anticipated that Level D protection will be adequate unless site conditions warrant higher levels of PPE, thus the following minimum PPE requirements will apply:

- Workers engaged in the active large-scale excavation or grading (drilling oversight personnel, grader operators, ground crew/spotters, and dozer operators) will wear Level D protection.
- Workers engaged in water, soil, and/or biota sampling activities will wear modified Level D protection.
- Support workers (supervisors, observers etc.) will wear Level D protection.

The level of personal protection worn by field personnel will be defined, controlled, and implemented by the Field Supervisor. Protection may be upgraded or downgraded by the Project Manager, as deemed necessary throughout the project. Required PPE items include the following: hardhats, hard-toed boots, safety glasses, and hearing protection. Additional safety items to be maintained in each vehicle include, but are not limited to: chock block, 2-way radio, lights/flags, cones, spill kit, fire extinguisher, and first aid kit. Other PPE and safety items may be required depending on conditions and safety procedures specified by the mine.

Personal protective equipment and additional health and safety documentation are described in Attachments 6 and 7 for the various Contractors supporting the field investigation program.

5.1.1 Level C Personal Protection

- Disposable Tyvek® coveralls (exchanged when heavily soiled or after breaks, at least once per work day);
- Work gloves (disposable nitrile/cotton or leather, depending on task);
- Approved NIOSH safety hard-toe work boots (conforming to ANSI Standard Z 41.1);
- Hard hats (conforming to ANSI Standard Z 89.1);
- Safety goggles (conforming to ANSI Standard Z 87.1);
- Hearing protection (when excessive noise is present); and
- Full-face or half-face respirator with a high efficiency particulate air (HEPA) cartridge filter (conforming to ANSI Standard Z 88.2).

5.1.2 Modified Level D Personal Protection

Modified Level D personal protective equipment may include the following:

- Blue jeans or natural fiber pants, long sleeve natural fiber shirt;
- Work gloves (disposable nitrile or cotton, depending on task);
- Approved NIOSH safety hard-toe work boots (conforming to ANSI Standard Z 41.1);
- Hard hat (conforming to ANSI Standard Z 89.1);
- Safety glasses or sunglasses (conforming to ANSI Standard Z 87.1);
- Orange traffic safety vest;
- Hearing protection (when excessive noise greater than 85 dBA is present); and
- Disposable Tyvek coveralls, if appropriate (exchanged when heavily soiled or after breaks, at least once per work day).

5.1.3 Level D Personal Protection

Level D personal protective equipment is basic and includes the following:

- Blue jeans or natural fiber pants, long sleeve natural fiber shirt;
- Work gloves;
- Approved NIOSH safety hard-toe work boots (conforming to ANSI Standard Z 41.1); and
- Hard hat (conforming to ANSI Standard Z 89.1).
- Safety glasses or sunglasses (conforming to ANSI Standard Z 87.1)

5.2 PPE Deviation/Modification

Protection levels may be upgraded, downgraded, or modified as deemed necessary by the Project Manager based upon work task or Site-specific, safety-related factors such as:

- When excessive noise levels exceed 85 dBA;
- Change of season/weather;
- When temperature extremes or individual medical considerations (i.e., heat stress, medication, etc.) limit the effectiveness of PPE; or
- Contaminants other than those previously identified are encountered.

5.3 Limitations of PPE

PPE ensembles designated for use during work tasks have been selected to provide protection against contaminants at known or anticipated concentrations in soil or water matrices. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all types of chemicals. Permeation of a given chemical through PPE is a complex process governed by contaminant concentrations, environmental conditions, physical condition of the protective garment, and the resistance of a garment to a specific contaminant. Chemical

permeation may continue even if a garment is resistant to a specific contaminant and may continue even after the source of contamination has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all Site personnel using PPE:

- When using disposable Tyvek coveralls, don a clean, new garment after each rest break or at the beginning of each shift;
- Inspect all clothing, gloves, and boots both prior to and during use for:
 - Imperfect seams;
 - Nonuniform coatings;
 - Tears; and
 - Poorly functioning closure.
- Inspect reusable garments, boots, and gloves both prior to and during use for:
 - Visible signs of chemical permeation;
 - Swelling;
 - Discoloration;
 - Stiffness;
 - Brittleness;
 - Cracks;
 - Any sign of puncture; and
 - Any sign of abrasion.
- Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of contaminants will not be reused and will be discarded.

5.4 Donning of PPE

A routine will be established and followed at the Site for donning PPE. The procedures will be discussed in detail during the Site safety meeting before starting the project and briefly during periodic Site safety meetings.

Before wearing any level of PPE, it will be checked that it is in proper condition for the purpose for which it is intended. Also, workers with any minor injuries and/or openings in the skin surface, such as cuts and scratches, will be attended to in order to protect such areas which may potentially enhance exposure effects. Workers with large cuts, rashes, or other such skin damage will not be allowed to don PPE.

6.0 SITE CONTROL MEASURES

The Site control measures program is designed to minimize the exposure of personnel to potentially hazardous substances and/or situations. In this section, the term "site" refers to the immediate work area. This objective will be accomplished by the establishment of work zones, the proper decontamination of personnel and equipment, and proper maintenance of safety equipment.

Exclusion Zone: The area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the exclusion zone requires the use of personal protective equipment. The exclusion zone for this work is the area in a 50-foot radius from any excavating, demolition, or trenching equipment and areas where lining activities are occurring.

Decontamination Zone: Personnel performing equipment decontamination will wear personal protective gear. Specific procedures for personnel decontamination are outlined under Section 4.8, Decontamination Plan. The contamination reduction zone will be set up adjacent to each exclusion zone.

Support Zone: The area situated in clean areas near the work areas.

The following general safe work practices will apply during site activities:

- All on-site personnel and any visitors to the site during work activities described in this HASP shall read and sign this safety plan prior to entering and/or working on the site. The master copy (with signature sheet) of this safety plan will be held by the Health and Safety Officer.
- No project personnel may be allowed on-site without the prior knowledge and consent of the designated Field Supervisor.
- Project personnel shall bring to the attention of the Field Supervisor or Health and Safety Officer any unsafe condition or practice associated with on-site project-related activities.
- Personnel will not eat, chew gum or tobacco, smoke, take medicine or perform any other practice that increases the likelihood of hand-to-mouth transfer of potentially hazardous substances from gloves, unwashed hands or equipment.
- No one is to carry "strike-anywhere" matches or cigar/cigarette lighters.
- Personnel will stand upwind of all intrusive activities involving disturbance of the ground surface (e.g., drilling).
- Dust control measures should be instituted if visible dust is created during excavation and other on-site activities by moving all personnel upwind or laterally from the dust source, and by misting the dust source with a water spray.
- Hands, face, and all other potentially contaminated areas shall be thoroughly cleaned prior to eating or leaving the site.

First aid supplies and drinking water will be located on-site.

6.1 Decontamination Plan

6.1.1 Equipment Decontamination

Equipment decontamination will not be required during the project, because contaminant levels are expected to be low

6.2 Emergency Response/Contingency Plan

The required elements of an emergency response plan as specified in 29 CFR 1910.120(1) are listed below. As described in the regulation, many of these items primarily pertain to emergency responses at uncontrolled hazardous waste sites, and thus are not entirely applicable to the anticipated Site activities, which do not constitute an emergency response situation. Any on-Site contractors will be responsible for providing an emergency response plan for their activities. An explanation of how each plan element will be implemented at the Site is provided below:

- 1) Pre-emergency planning - This emergency response plan will be provided to all personnel, including contractor personnel, working on the Site during the pre-entry briefing. In addition, emergency response actions will be reviewed with all personnel during the pre-entry briefing and the tailgate safety meetings.
- 2) Personnel roles, lines of authority, and communication - The Field Supervisor or Supervisors, if multiple teams are working in the study area, will be responsible for emergency coordination at all times. Any accidents and/or injuries shall immediately be reported to him or her. The Field Supervisor(s) will immediately report any accidents to the Project Manager and a Sunnyside representative.
- 3) Emergency recognition and prevention - Physical and chemical hazards at the Site will be reviewed at the pre-entry briefing and the tailgate safety meetings.
- 4) Safe distances and places of refuge - Should emergency conditions arise requiring Site evacuation, the Field Supervisor will notify all on-Site personnel immediately through the use of hand signals and verbal instructions.
- 5) Evacuation routes and procedures - The Field Supervisor will notify all on-Site personnel of the need for immediate evacuation. Site evacuation will be performed in an orderly fashion under the direction of the Field Supervisor.
- 7) Emergency decontamination procedures - In the event of a medical emergency, personnel decontamination prior to medical treatment may be omitted. Whenever possible, Formation personnel will accompany contaminated victims to the hospital to provide advice on matters involving decontamination. If on-Site first aid is rendered and the victim does not require transport to the hospital, clothing and equipment decontamination as described in Section 1.8 will be performed after first aid measures have been performed.

- 8) Emergency medical treatment and first aid - Based on the severity of the injury/exposure, additional medical treatment will be obtained as described in paragraph 9 below.
- 9) Emergency alerting and response procedures - The procedures listed below will be used in the event of any Site emergency:
 - a) Remove any injured person(s) from immediate danger and administer first aid as needed.
 - b) The Field Supervisor will carry a cell phone that provides communication to emergency personnel (911). Field workers will also carry cell phones at all times to allow contact with mine Field Supervisor or emergency personnel. Any medical incidents are to be reported to the Field Supervisor, aSunnyside representatives, and Project Manager immediately.
 - c) The nearest medical facility is the Mercy Regional Medical Center in Durango, CO. Driving directions to the hospital are presented in Figure 3.
 - d) Notify Project Manager before resuming work.
- 10) Critique of response and follow-up - Any accidents or emergency incidents shall be reported to the relevant local, state and federal agencies if needed. The report will include a summary of the emergency, a description of the conditions that led to the emergency, a review of the response actions implemented following the emergency and a discussion of steps that might have been taken to prevent a recurrence of the emergency. The Project Manager will coordinate with the Field Supervisor, the Health and Safety Officer and other appropriate Sunnyside personnel on follow-up reporting.
- 11) PPE and emergency equipment - All personnel will be required to have complete Level D, and Modified Level D PPE ensembles available for use when on Site. In addition, the Field Supervisor will have available a first aid kit, a fire extinguisher and possibly a portable eyewash kit.

6.3 Confined Space Entry Procedures

No confined space entry is anticipated during Site activities.

6.4 Spill Containment Program

Hazardous substance releases will be controlled and managed in accordance with Federal and State regulations. Water from decontamination efforts will be contained and allowed to

evaporate. A spill kit will be included in each vehicle to facilitate early response actions to any substance releases.

6.5 Hazard Communication

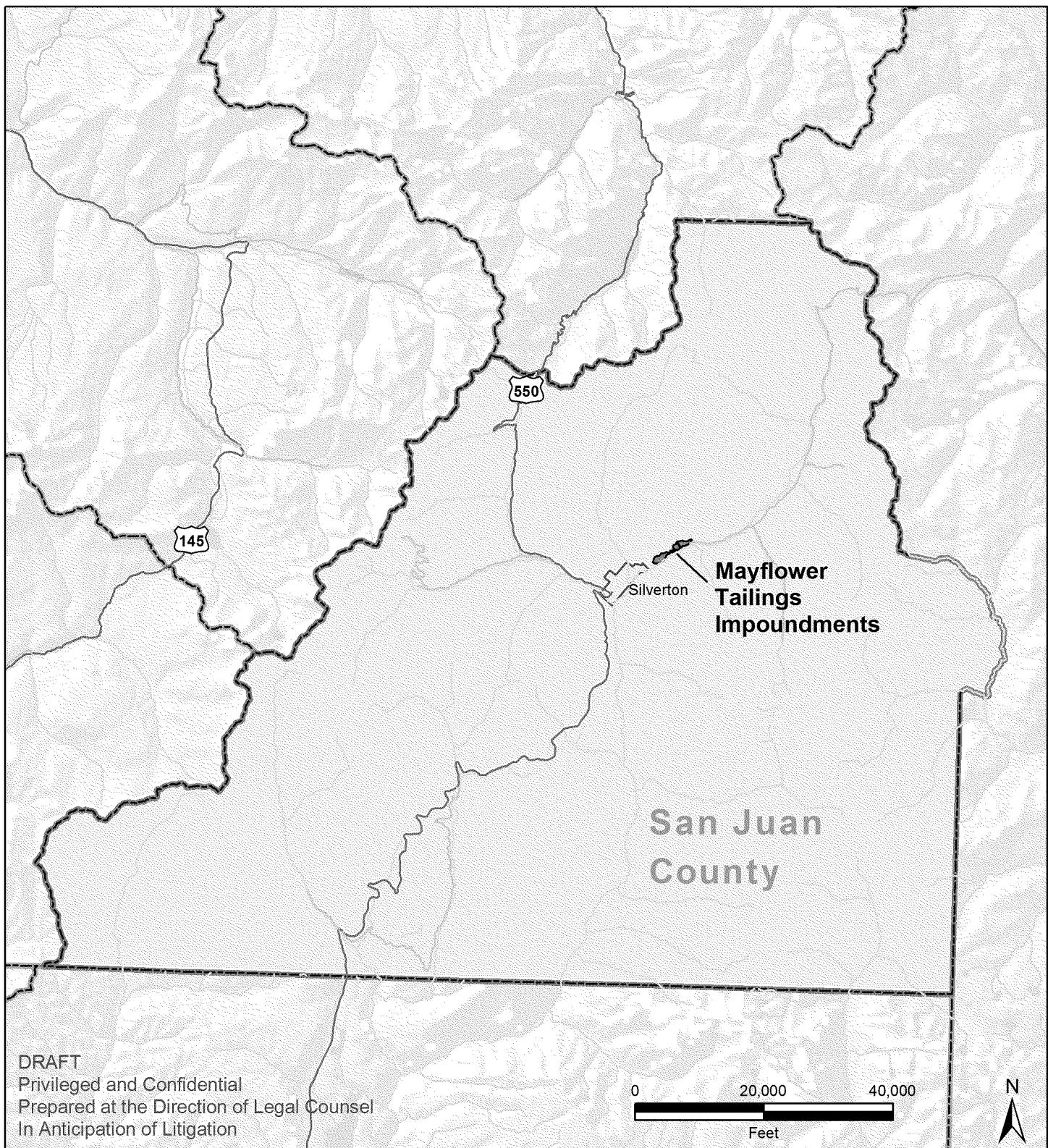
The Hazard Communication Act (29 CFR 1910.1200), commonly referred to as the "Worker Right to Know Act", was instituted by OSHA to reduce illness and injury caused by chemical exposure in the workplace.

Formation will inform its employees of potential hazards associated with chemicals brought to the Site to perform various field activities. The information will be distributed in the form of Material Safety Data Sheets (MSDSs). Copies of the MSDS for each chemical brought to the Site will remain on Site during the period that the chemical is being utilized. Safe handling practices and emergency first aid for each chemical will be discussed during the pre-entry briefing, tailgate safety meetings, etc.

7.0 HEALTH AND SAFETY PLAN REFERENCES

American Conference on Governmental Industrial Hygienists (ACGIH), 1995. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1995-1996: Cincinnati, OH.

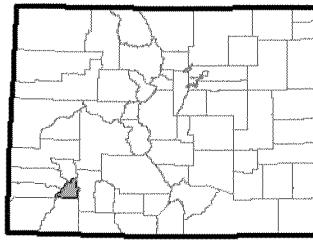
FIGURES



Legend

- Roads
- Highways
- Silverton, CO
- Mayflower Tailings Impoundments
- Counties

Location of The Sunnyside Mine
in San Juan County, Colorado



SUNNYSIDE GOLD

SILVERTON, CO

FIGURE 1

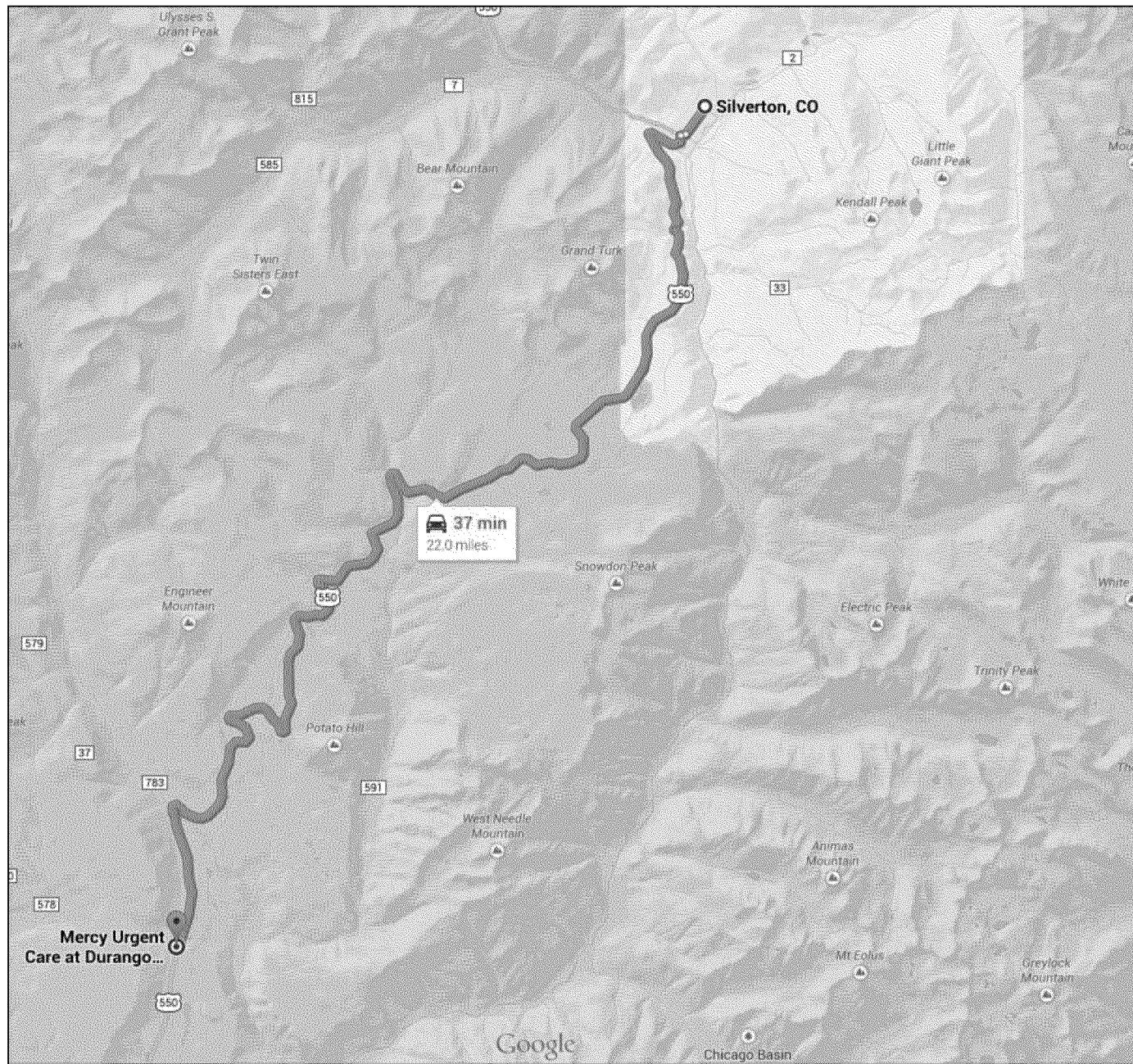
SITE LOCATION MAP

DATE: APR 01, 2015

BY: DKG FOR: BGH

FORMATION
ENVIRONMENTAL





Silverton, CO

- ↑ Head southeast on W 12th St toward Greene St
92 ft
- ↗ Turn right at the 1st cross street onto Greene St
0.5 mi
- ↗ Slight right onto Co Rd 2
417 ft
- ↖ Sharp left onto US-550 S
21.3 mi
- ↗ Turn right onto Purgatory Blvd
Destination will be on the left
154 ft

Mercy Urgent Care at Durango Mountain Resort
10 Purgatory Boulevard, Durango, CO 81301

SCALE

2 MILES



SUNNYSIDE GOLD

Silverton, CO

FIGURE 3

ROUTE TO NEAREST EMERGENCY FACILITY

DATE APR 01, 2015

BY: NBB FOR: BGH

FORMATION
ENVIRONMENTAL

**ATTACHMENT 1
PLAN ADDENDA**

ATTACHMENT 2
DAILY PRE-WORK/JOB SITE ASSESSMENT FORM

**Daily Pre-Work/Job Site Assessment
Environmental Sampling**

Date: _____ Performed by: _____ Title: _____

Brief Description of Assigned Task (s):

Work Area Inspection:	Acceptable		Describe actions taken to correct any deficiency:
	Yes	No	
1. Slope safe compared to where workers are located. 2. Work performed adjacent to mining activities. 3. Ground conditions safe to begin work. 4. Safe access provided to all work areas. 5. Hazardous materials stored properly. 6. Project materials stored safely. 7. Barricades & warning signs adequate. 8. Workers wearing appropriate PPE. 9. First aid, fire extinguishers, radios and special PPE readily available. 10. Power/hand tools, machinery and equipment meet safety standards.			

*Parts of the inspection can be done by designees.

Hazard Assessment of Assigned Task(s): [Note Hazard & Control Method]

Time of "pre-job" briefing: _____

Attendees:

Additional Comments:

ATTACHMENT 3
JSA – JOB SAFETY ANALYSIS

Field Monitoring – In and around streams, ponds, lakes

Sequence of Basic Job Steps	Potential Accidents or Hazards*	Recommended Safe Job Procedures
Prepare for site visit, identify PPE needs, ensure field crew has appropriate safety training	N/A	Familiarize self with site prior to visit, including terrain and potentially hazardous water flows and temperatures. Prepare Health and Safety Plan (HASP), ensure field crew has reviewed HASP and are aware of potential hazards. Ensure at least one or more member of each field crew is First Aid-trained. Inspect all PPE and equipment and ensure that it is working properly.
Assess weather conditions to be encountered during site visit	Heat exposure Sun exposure Cold exposure (dry and wet)	Familiarize self with signs of heat related illnesses: cramps, heat rash, dehydration, heat exhaustion, and heat stroke. Keep body protected; wear sunscreen, sunglasses or safety glasses, wide-brimmed hat or hardhat (depending upon PPE requirements), proper clothing. Ensure adequate fluid intake. During cold weather - layer clothing and wear wind impervious outerwear; during warm months – wear a long sleeve cotton/breathable fabric shirt and pant. In water work – wear appropriate waders and boots, gloves and outer wear to reduce cold and wet exposure.
Carry and load sample coolers and equipment	Slip/Trip/Fall Muscle strains	Employ proper ergonomics when lifting; Get help from a coworker to carry and load coolers and other equipment.
Travel to and from site	Moving vehicles on road or in parking areas Traffic hazards Slip/Trip/Fall Vehicle contact with fixed or movable objects	Be attentive to outside conditions when entering or exiting vehicle. Secure equipment load to avoid shifting. Follow defensive driving practices. Reduce speed on surfaces suspected of being slippery due to ice, rain or other conditions.
Conduct visual inspection of site conditions	Animals, stinging insects, ticks, sharp objects (wire, fence,	Identify areas where biological hazards may be present; wear insect repellent

	<p>protruding branches or sharp rocks);</p> <p>Slip/Trip/Fall</p> <p>Haul Trucks and other heavy equipment</p>	<p>on exposed skin surfaces; wear long sleeve shirt and full length pants; avoid high grass areas if possible; tuck pants leg into boot; do not put hand/arm into/under an area that you cannot see into/under clearly.</p> <p>Avoid fences if possible, or use help to move through fenced areas to avoid scrapes, cuts abrasions. Wear gloves when opening/closing gates to protect against splinters and barbs.</p> <p>Be sure of footing (wet/muddy conditions may exist, loose rock may be present, sage brush or other woody materials may be present with protruding branches).</p> <p>Where site is on or near mine property, be aware heavy equipment that may be operated nearby. Follow appropriate site-specific safety precautions when parking (use chocks), travelling (wear seatbelts), or working near or on the mine site.</p>
Lifting heavy objects (generators, sampling equipment, coolers, 5-gallon buckets, totes, etc.)	Muscle strain	Use proper ergonomics when lifting heavy objects; use two people to lift gear and equipment as needed based on weight to be lifted.
Donning and doffing waders	Slip/Trip/Fall	Donning and doffing waders to be done on stable ground or a sitting position to avoid losing balance.
Sampling including retrieval of surface water and sediment samples, and flow measurement	<p>Contaminated media</p> <p>Eye/skin contact with biological agents and chemicals</p> <p>Inhalation of chemical vapors (preservatives)</p> <p>Dangerous animals and vegetation</p> <p>Heat exhaustion and sun exposure</p> <p>Hypothermia/cold water exposure</p> <p>Stinging insects</p> <p>Slip/Trip/Falls</p> <p>Muscle and soft tissue injury</p> <p>Drowning</p>	<p>Wear site/activity-appropriate PPE; Review and understand MSDS for all chemicals being handled. Be careful when handling acids and caustic substances. Wear adequate PPE and wash hands after completion of task.</p> <p>Position body in order to minimize downwind exposure.</p> <p>Be aware of surroundings. Learn to identify, and avoid, toxic plants such as poison ivy. Watch for dangerous animals, such as aggressive dogs on private property, badgers, and harmful insects.</p> <p>Be aware of animal burrows, uneven, and/or loose terrain.</p> <p>Avoid dehydration, excessive sun and heat exposure, wear hats, sunglasses and sunscreen. Wear appropriate PPE for site conditions.</p>

		<p>Wear waders and non-skid wading boots. Where water depths exceed on average waist-deep for an individual, wear a personal flotation device (PFD). Wear wading belt, securing fastener at waist, to minimize filling waders in case of submersion. If a worker does not feel comfortable about the velocity of the river water, do not enter. Fast-moving water could result in a fall and subsequent risk of drowning.</p> <p>Avoid muddy and/or steep banks when entering or exiting the water. If necessary, use a buddy system to aid entrance and exiting water.</p>
Icing (reicing) sample coolers, transporting coolers and other equipment back to laboratory	Slip hazard Muscle and back Injury	Use due care when draining water from coolers, use proper ergonomics when lifting and moving coolers and other equipment.
Site exit	Contaminated vehicle	Wash hands promptly. Used disposable PPE should be disposed on-site. If excess mud or debris is present on truck, wash before leaving mine site.
Drive home or to next site	Traffic hazards	FOLLOW "TRAVEL TO SITE" PROCEDURES

ATTACHMENT 4
WIND CHILL CHART

Wind Chill Factor

Actual air temperature °F

calm 40 30 20 10 0 -10 -20 -30 -40

Apparent temperature

10	34	21	9	-4	-16	-28	-41	-53	-66
20	30	17	4	-9	-22	-35	-48	-61	-74
30	28	15	1	-12	-26	-39	-53	-67	-80
40	27	13	-1	-15	-29	-43	-57	-71	-84
50	26	12	-3	-17	-31	-45	-60	-74	-88
60	25	10	-4	-19	-33	-48	-62	-76	-91

Frostbite times:

30
minutes

10
minutes

5
minutes

National Weather Service (NWS) Wind Chill Chart adapted May 2004 from
<http://www.nws.noaa.gov/om/windchill/>

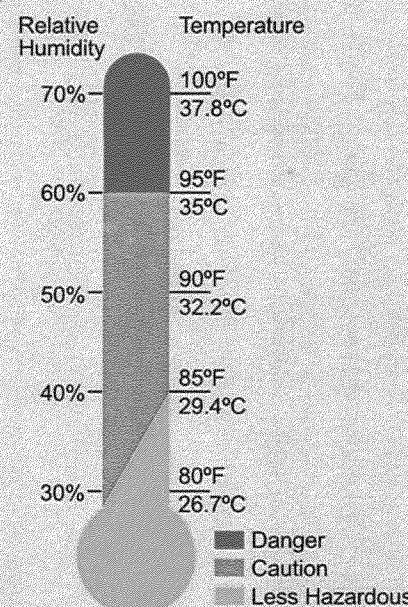
**ATTACHMENT 5
HEAT STRESS EDUCATION POSTER**



The Heat Equation

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, serious heat illnesses may occur. The most severe heat-induced illnesses are heat exhaustion and heat stroke. If left untreated, **heat exhaustion** could progress to **heat stroke** and possible death.



Heat Exhaustion

What are the symptoms?

HEADACHES; DIZZINESS OR LIGHtheadedness; WEAKNESS; MOOD CHANGES SUCH AS IRRITABILITY, CONFUSION, OR THE INABILITY TO THINK STRAIGHT; UPSET STOMACH; VOMITING; DECREASED OR DARK-COLORED URINE; FAINTING OR PASSING OUT; AND PALE, CLAMMY SKIN

What should you do?

- Act immediately. If not treated, heat exhaustion may advance to heat stroke or death.
- Move the victim to a cool, shaded area to rest. Don't leave the person alone. If symptoms include dizziness or lightheadedness, lay the victim on his or her back and raise the legs 6 to 8 inches. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or applying a wet cloth to the person's skin.
- Call 911 for emergency help if the person does not feel better in a few minutes.

Heat Stroke—A Medical Emergency

What are the symptoms?

DRY, PALE SKIN WITH NO SWEATING; HOT, RED SKIN THAT LOOKS SUNBURNED; MOOD CHANGES SUCH AS IRRITABILITY, CONFUSION, OR THE INABILITY TO THINK STRAIGHT; SEIZURES OR FITS; AND UNCONSCIOUSNESS WITH NO RESPONSE

What should you do?

- Call 911 for emergency help immediately.
- Move the victim to a cool, shaded area. Don't leave the person alone. Lay the victim on his or her back. Move any nearby objects away from the person if symptoms include seizures or fits. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) if alert enough to drink something, unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or wiping the victim with a wet cloth or covering him or her with a wet sheet.
- Place ice packs under the armpits and groin area.

How can you protect yourself and your coworkers?

- Learn the signs and symptoms of heat-induced illnesses and how to respond.
- Train your workforce about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Build up tolerance to the heat and the work activity slowly. This usually takes about 2 weeks.
- Use the buddy system, with people working in pairs.
- Drink plenty of cool water, about a cup every 15 to 20 minutes.
- Wear light, loose-fitting, breathable clothing, such as cotton.
- Take frequent, short breaks in cool, shaded areas to allow the body to cool down.
- Avoid eating large meals before working in hot environments.
- Avoid alcohol or beverages with caffeine. These make the body lose water and increase the risk for heat illnesses.

What factors put you at increased risk?

- Taking certain medications. Check with your health-care provider or pharmacist to see if any medicines you are taking affect you when working in hot environments.
- Having a previous heat-induced illness.
- Wearing personal protective equipment such as a respirator or protective suit.

ATTACHMENT 6
MINIMUM HEALTH AND SAFETY STANDARDS



1.0 PURPOSE

This Standard defines the minimum requirements to ensure contractors and suppliers engaged by Kinross comply with Kinross Gold's health and safety requirements and have effective H&S performance while operating for Kinross.

2.0 SCOPE

This Standard applies to all employees, contractors, suppliers and consultants at operating, exploration and project sites under the direct management of Kinross Gold Corporation or its subsidiaries.

3.0 DEFINITIONS

Contractor

- A company or individual engaged under contract to carry out a discrete project, specific tasks or to provide defined services on behalf of Kinross. For the purposes of this standard, contractors fall into three categories:

Category 1

Individuals engaged to work, under temporary contract (temporary employee hired directly by the Company) within existing operations and under direct Company supervision or Consultants and other contractors engaged in non-hazardous activities.

Category 2

Companies or individuals engaged for a discrete project remote from existing operations areas.

Category 3

Companies or individuals engaged under contract to carry out specific tasks or provide specified services within existing operations areas.

Designated Responsible Person

- Kinross employee responsible for oversight of health and safety aspects of a contract scope of work or supply.

4.0 REQUIREMENTS

All sites shall have a Health and Safety management plan in place to address the following requirements of a Contractor Management program:

- As part of the procurement process, criteria are required for evaluating the ability of contractors and suppliers to deliver their services and products in line with Kinross requirements for health and safety performance. Evaluation criteria will include injury frequency rate statistics for the past three years. Performance against these criteria will be assessed as part of the overall bid or proposal evaluation.
- Wherever practical, sites should prepare a list of contractors whose safety performance warrants their being placed on a pre-qualified list of suitable contractors.
- Contractual agreements shall include clear language to define contractor health and safety responsibilities and penalties for non-compliance, up to and including contract severance.
- All contractors must have a designated H&S representative who is responsible for:

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1. Ensuring adequate, timely information is supplied to contractors and suppliers prior to mobilization and during execution of the work to protect the health and safety of all personnel;
2. Ensuring all contractor personnel complete all required inductions and job-specific orientations for their specific scope of work;
3. Ensuring, where practical, the contractor's work area is clearly demarcated;
4. Monitoring the contractor's work to ensure compliance with the site health and safety management system, including safe supply of all material and equipment and all permit;
5. Coordinating regular communication and formal meetings to address health and safety issues;
6. Reporting all incidents and health and safety data per site and Kinross requirements.

- The contractor's H&S representative shall attend a formal initial meeting as well as regularly scheduled meetings with Kinross H&S which defines requirements for the contractor's H&S program, expectations and responsibilities of the contractor and performance against expectations.
- The contractor's H&S representative shall also receive supervisory training in key health and safety leadership competencies as outlined in HS-S-03.01 Training. Training records shall be maintained.
- Category 1 contractors are subject to all the health and safety requirements applicable to employees.
- Category 2 contractors are required to develop and submit for approval a health and safety management plan that adequately identifies the health and safety hazards and control measures applicable to their scope of work prior to mobilization. Additionally, the health and safety management plan must address regulatory and contractual compliance, communication and reporting protocols and levels of supervision.
- Category 3 contractors are required to comply with all site programs and procedures as well as regulatory requirements.
- A pre-bid and/or pre-award meeting will be held with all potential Category 2 and 3 contractors to explain the potential hazards associated with the work and to outline the health and safety expectations Kinross has of the contractor.

5.0 ANNEXES

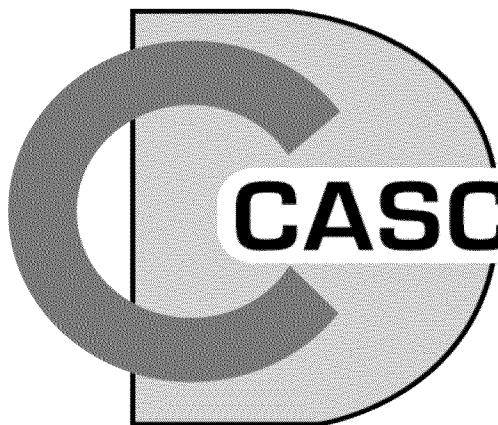
6.0 REFERENCE DOCUMENTS

- HS-S-03.01 Training

Version	Date	Description	Author	Approved
01	19.06.2012	Final	Tracey Jeffs	

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**ATTACHMENT 7
CASCADE DRILLING HASP**



CASCADE DRILLING, L.P.

LEADERS IN SAFETY

Site Health and Safety Plan (HASP)

Jamey E Smith
Cascade Drilling, LP
07/20/2015



This Site-Specific *Health and Safety Plan* is a supplement to the (CDLP) *Injury and Illness Prevention Program*, Tailgate Safety Meeting, Required JSA's & completed SJSAs form. Map to Hospital also included

Project Name:	Sunnyside	Project #:	
Address of Project Site:	Silverton, CO	Date:	07/20/2015
Subcontractor on Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Project Start Date:	08/03/2015	Expected Project Duration:	20 days
			
EHS Manager	Jamey E Smith		07/20/2015
	Name	Signature	Date
Project Driller:	Josh Parks		
	Name	Signature	Date
Project Mgr:	Ron Cain		
	Name	Signature	Date

SCOPE:

Drill 17 boring and install 8 monitoring wells using Rotosonic drill rig. Boring depths to approximately 120 ft. / bedrock. Backfill with bentonite grout or chips.

ORGANIZATIONAL STRUCTURE (in compliance with 29 CFR 1910.120(b)(2))

This chapter of the Health and Safety Plan describes lines of authority, responsibility, and communication as they pertain to health and safety functions at this site. The purpose of this chapter is to identify the personnel who impact the development and implementation of the site health and safety plan and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establish the lines of communication among them for safety and health matters.

The organizational structure of this site's safety and health program is consistent with OSHA requirements in 29 CFR 1910.120(b)(2) and provides the following site-specific information:

- the general supervisor who has the responsibility and authority to direct all operations
- the site safety and health officer who has the responsibility and authority to develop and implement this HASP and verify compliance
- other personnel needed for operations and emergency response and their general functions and responsibilities
- the lines of authority, responsibility, and communication for safety and health functions

This section is reviewed and updated as necessary to reflect the current organizational structure at this site.

Roles and Responsibilities

All personnel and visitors on this site must comply with the requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

ALL EMPLOYEES HAVE THE RIGHT AND THE RESPONSIBILITY TO STOP WORK IF CONDITIONS ARE NOT SAFE –

Project Manager (PM)

The Project Manager (PM) for this site is listed above. The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Safety and Health Officer (SSHO), and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

Preparing and coordinating the site work plan; providing site supervisor(s) with work assignments and overseeing their performance; coordinating safety and health efforts with the SSHO; ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); serving as primary site liaison with public agencies and officials and site contractors. On smaller projects, the PM will serve multiple rolls, and may include the EC and SSHO.

**Site Safety and Health Officer (SSHO)**

The Site Safety and Health Officer (SSHO) for this site is listed above and may be the Project Manager if a specific SSHO is not identified. The SSHO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SSHO reports to the Corporate Environmental Health and Safety Department. The SSHO or representative is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected.

The specific responsibilities of the SSHO (PM if assuming the rolls of the SSHO) are:

Managing the safety and health functions on this site; serving as the site's point of contact for safety and health matters; ensuring site monitoring, worker training, and effective selection and use of PPE; assessing site conditions for unsafe acts and conditions and providing corrective action; assisting the preparation and review of this HASP; maintaining effective safety and health records as described in this HASP; coordinating with the Emergency Response Coordinator (ERC), Site Supervisor(s), and others as necessary for safety and health efforts.

Site Supervisor

For most projects, the Driller will also serve in this role. The Site Supervisor ensures the implementation of the HASP requirements and procedures in the field.

The specific responsibilities of the Site Supervisor are:

Executing the work plan and schedule as detailed by the PM; coordination with the Site Safety and Health Officer (SSHO) on safety and health; ensuring site work compliance with the requirements of this HASP. All employees have the authority and responsibility to STOP WORK if unsafe conditions are detected

Site Workers

Site workers are responsible for complying with this HASP, using the proper PPE, reporting unsafe acts and conditions, and following the work and safety and health instructions of the Project Manager (PM), Site Safety and Health Officer (SSHO), and Site Supervisor. The site workers may be listed above in the personnel table.

Identification of Other Site Contractors:

None

Other local/State/Federal Agency Representatives and Their Roles Responsibilities

Unknown at this time.

There are three major categories of emergencies that could occur during any project:

- Illness, physical injury and or property/equipment damage
- Catastrophic event (fire, explosion, earthquake, chemical, or radioactive); and
- Safety equipment failure.

Although a catastrophic event, severe medical emergency, or safety equipment failure are unlikely to occur during work activity at the Site, an emergency action plan is outlined below.

EMERGENCY ACTION PLAN			
Emergency Contact & Services			
Title	Name	Contact #'s	Title
Safety Manager	Jamey Smith	503.539.9504	Hospital
First Aid/CPR	Josh Parks	936-465-5752	Fire Dept.
Project Manager	Ron Cain	623-935-0124 / 623-203-8967	Ambulance
Office H&S Support	Jamey Smith	503.539.9504	
Project Support	N/A		
Client Contact	Kinross- Linda MH Schmoll, PhD	720-387-3624 / 303-493-1595	

Catastrophic Event or other Emergencies Requiring Evacuation:

In the event of a catastrophic event such as fire or explosion, if the situation can be readily controlled with available resources without jeopardizing your health and safety or the health and safety of others, take immediate action to do so, otherwise follow these steps:

1. **Notify Emergency Personnel by calling 911.**
2. **Isolate the fire to prevent spread.**
3. **Evacuate the area.**



4. **Assemble at the Muster Station: To be determined onsite**
5. **Perform head count to ensure complete evacuation.**
6. **Inform Emergency Personnel of any missing team members.**

First Aid Resources	
Method of communication	Cell Phone
Location of First Aid at the project site	In drilling rigs & support equipment
Location of nearest telephone if outside assistance is required	All crew equipped with Cellular phones
Other	911

Medical Emergencies

Medical emergencies can be described as situations that present a significant threat to the health of individual personnel.

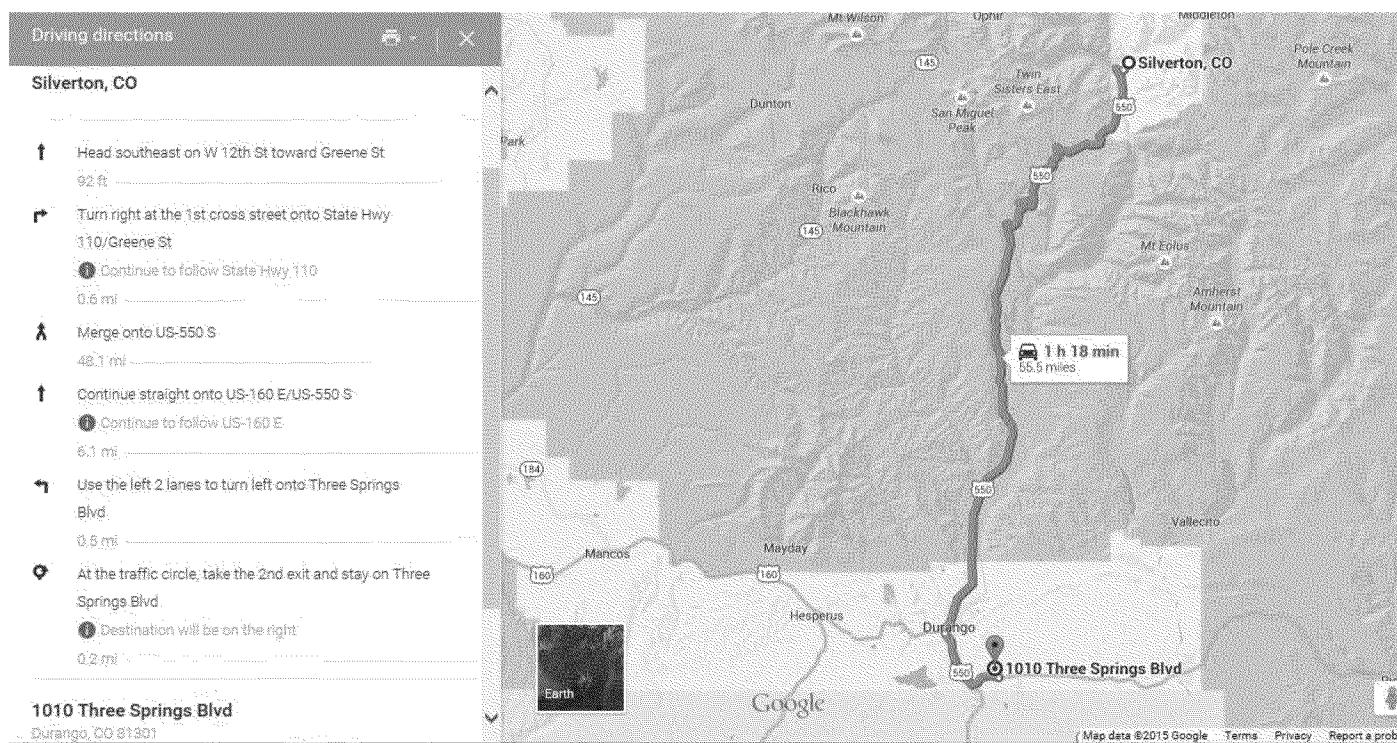
These can result from a variety of hazardous incidents including chemical and radioactive exposures, heat stress, cold stress, poisonous insect or snakebites, and accidents involving vehicles or heavy equipment. In the event of a medical emergency, implement the following guidelines:

1. Assure that the environment is safe;
2. Administer appropriate emergency first aid to all injured individuals, only if it is safe to do so, and only by a qualified individual trained in first aid;
3. Notify emergency personnel and follow their instructions;
4. If emergency personnel cannot be contacted, severely injured personnel shall be transported to the designated hospital/ trauma center identified on the following page.
5. Contact WorkCare at the earliest possible time to report the work-related injury. **888-449-7787**

NEAREST HOSPITAL INFORMATION AND DIRECTIONS	
Name:	<u>Mercy Regional Medical Center – Durango</u>
Phone Number:	(970) 247-4311
Address:	1010 Three Springs Blvd Durango, CO 81301
	<u>See below</u>
Emergency Room: Yes	<u>Yes</u> or <u>No</u>

Map & Directions go here

Mercy Regional Medical Center
(~ 1hr20min./ 55.5 Miles from Site)



PRE – DEPARTURE: IMPORTANT THINGS TO CHECK & REMEMBER

1. Ensure that the Project Manager, Health and Safety Coordinator, and Project Director have approved this HASP.
2. Ensure that your Project Manager, Site Safety Officer or Health and Safety Coordinator has discussed the contents of the HASP in detail, gone through the Hazard Assessment with you and explained the hazards associated with the work that you will be performing.
3. Ensure that you have all the required PPE and are trained in the areas which are indicated in this HASP.
4. Familiarize yourself with the Emergency Action Plan for the site prior to site arrival.
5. Check the weather in the immediate area of the project site to ensure that the current weather conditions do not create additional hazards that have not been evaluated.
6. Inquire about cell phone coverage (satellite communications may be the ONLY option in some locations) and physically test all of your means of communication to ensure that they function, and you are familiar with the controls.
7. If you are going to a site where activities are in progress, do not begin work until you have been given an orientation from the Site Safety Officer and have reviewed any existing Site Health & Safety Manual.
8. Review subcontractor's site-specific HASP, as applicable.
9. You have the right to refuse any work that you feel is unsafe, or that you are not trained to do. Please discuss your concerns immediately with the Project Manager, Site Safety Officer and Health and Safety Coordinator.

HEALTH AND SAFETY CLEARANCE

Cascade employees as well as subcontractor employees assigned to perform field activities covered by this procedure must have active health and safety clearance statuses. This means that during the past 12 months, they have been cleared by a physician to wear respirators and perform their field assignments and have satisfied health and safety training requirements specified in 29 CFR 1910.120(e).



FIELDWORK HEALTH & SAFETY PLAN

Project Personnel							
Team Member	Function	Cell Ph. #	Other Ph. #	Allergies	Emergency Contact		Init.*
					Name	Phone #	
Josh Parks	Driller	562-360-4964	NA	NA	Jamey Smith	503.539.9504	
Tom Shalkowitz	Driller Assistant	480-353-7698					
Casey Gray	Driller Assistant	928-862-0321					

*All Project Personnel must initial in this column beside their name to indicate that they have read & understood the project Health & Safety Plan

Project-Specific Check-in Procedure

If you are in the field alone, or if you are the only person on-site, you must check in with the PM or a designee a minimum of twice each day, preferably once in the mid-morning and once in the mid-afternoon. Document check-in times below and add any relevant notes.

Check-In Times & Notes

	AM	PM:		
	0600	0500	Crew to check in with operations daily and during the project	

If check-in does not occur at the pre-scheduled time, the PM will follow these steps:

1. Call field personnel cell phone to make contact.
2. Call client contact if present on site.
3. Call emergency contact.
4. Call emergency search services.

JSA-HAZARD EVALUATION/JOB SAFETY ANALYSIS:

(in compliance with 29 CFR 1910.120(b)(4)(ii)(A), and 1910.120

This chapter of the HASP describes the safety and health hazards associated **(job safety analysis)** with site work and the control measures selected to protect workers. The purpose of a job safety analysis (JSA) is to identify and quantify the health and safety hazards associated with each site task and operation, and to evaluate the risks to workers. Using this information, appropriate control methods are selected to eliminate the identified risks if possible, or to effectively control them. The control methods are documented in each task-specific JSA. The information contained in this chapter is essential to effective preparation of all other chapters of the HASP. This section of the HASP includes:

- (JSA) job safety analysis **(JSA BOOKS IN EVERY CDLP DRILL RIG)**
- hazardous substance information
- employee notification of hazards

The person responsible for ongoing job hazard analysis at this site is the Project Manager unless specified above.



GENERAL PROPERTIES OF CHEMICALS KNOWN OR SUSPECTED TO BE ON-SITE				
TASK	Constituent	Physical State	Potential Exposure Routes	Recommend Safety Measures
Excavation of Site soil/drilling, confirmation soil sampling	Petroleum distillates/VOC	Solid, in soil	Dermal (skin) and or eyes	Wear appropriate Personal Protective Equipment (PPE) as required in this plan. Use proper personal hygiene measures such as frequent hand-washing after exposure or potential exposure to contaminated soils and materials. No hand to face contact
	Petroleum distillates/VOC	Solid, in soil	Ingestion	Wear appropriate Personal Protective Equipment (PPE) as required in this plan. Use proper personal hygiene measures such as frequent hand-washing after exposure or potential exposure to contaminated soils and materials. No hand to face contact.
	Petroleum distillates/VOC	Solid, in soil	Inhalation	No eating, smoking, gum chewing, drinking in the exclusion or contamination reduction zones. Eating, drinking and smoking only in approved areas. Wear appropriate Personal Protective Equipment (PPE) as required in this plan. Stand upwind of dust release if possible. Water will be utilized as dust suppression.
Excavation of Site soil/drilling, confirmation soil sampling	Silica	Solid in soil	Inhalation	Wear appropriate Personal Protective Equipment (PPE) as required in this plan. Stand upwind of dust release if possible. Water will be utilized as dust suppression
Injection and handling of injection chemicals				

The following substances are known or suspected to be on site. The primary hazards of each are identified.

EXPOSURE LIMITS			
CONSTITUENT	PEL/TLV/TWA or REL ¹	IDLH	Symptoms of acute exposure
Oil	5 mg/m ³ (mineral oil mist)	2500 mg/m ³	Irritated eyes, skin and respiratory system
Heavy Metals (e.g. cadmium, chromium, lead)	0.01-5 mg/m ³	5-50 mg/m ³	Coughing, irritated nose, headache, metallic taste, chills, tight chest
Silica**	PEL-10mg/m ³ divided by %SiO ₂ plus 2 TWA-0.05 mg/m ³ **	NA	Cough, wheezy, decreased pulmonary function, irritation of eyes
Hydrogen Sulfide	10 ppm (10 min)	100 ppm	Irritated eyes, resp. system, apnea, coma, eye pain, headache
Methane	Simple Asphyxiant	Simple Asphyxiant	Rapid breathing, diminished mental alertness, fatigue, nausea
Aliphatic hydrocarbons (as petroleum distillates)	500 ppm	1100 ppm	Irritated eyes, nose, throat, dizzy, headache, nausea, dry cracked skin, drowsy
Tetrachloroethene	TWA: 100 ppm	Ca 150 ppm	Irritated eyes, nose, throat. Dizziness

Abbreviations Used: PEL = Permissible Exposure Limit (OSHA); TLV = Threshold Limit Value (ACGIH);

REL = Recommended Exposure Limit (NIOSH); STEL=Short Term Exposure Limit (OSHA); IDLH=Immediately Dangerous to Life and Health; LEL = Lower Explosive Limit; ppm = parts per million; mg/m³ = milligrams per cubic meter. NE = Not Established. NA = Not Applicable

Notes:

1. TLV or REL listed when they are lower than the PEL.

**Potential airborne contaminant concentrations are estimated using a conservative dust concentration of 2 mg/m³. Actual dust concentrations during the work are expected to be much lower and exposure durations are expected to be much less than 8 hours.



WARNING PROPERTIES/Route of Entry		
CONSTITUENT	WARNING PROPERTIES	Primary Route of Entry
Silica	Dust (visible)	Primary route of entry, inhalation. It is anticipated < 2mg/m3 exposure.
Methane	Odorless, colorless, flammable	Inhalation
Petroleum Distillates	Gasoline or Kerosene like odor	Inhalation.
Hydrogen Sulfide	Strong odor of rotten eggs	Inhalation
Oil	Odor like burned lubricating oil	Absorption/inhalation as mist
Metals	Metallic taste, coughing	Ingestion/inhalation as dust
Tetrachloroethene	Chloroform like odor. Irritated eyes, nose, throat.	Inhalation and absorption if handled directly.

PROJECT-SPECIFIC HAZARD ASSESSMENT

Date:	07-20-2015
Assessment Conducted By:	Ron Cain/ Josh Parks
Address of Project Site:	Silverton, CO
Description of Site:	Tails piles of old mine workings/ outside
Work to be Accomplished	Drill 17 shallow wells

TASK	RECOGNIZED HAZARD	METHOD OF MITIGATION
General material handling	Struck by or against trucks or heavy equipment	Establish and follow a traffic control plan. Wear reflective warning vests. Avoid equipment swing areas; Make eye contact with operators before approaching equipment or trucks. Use spotters and flaggers as necessary to direct trucks and nearby traffic. All lift trucks must have operating back up alarm.
	Overhead Powerlines and obstructions	Review entire space prior to setting up any rig, crane or raising any equipment. Stay a minimum of 10 feet from any high voltage wires. Additional distance required depending on voltage.
	Underground utilities and hazards	Contact Dig Alert and or equivalent agencies prior to any digging. Review possible abandoned utilities with customer prior to any digging.
	Decontamination of surfaces/equipment	Wear proper chemical protective PPE. Isolate all equipment; lock out tag out if required. Ensure all hoses/tubes/lines are drained. Slips on wet surfaces, do not walk on wet surfaces.
	Forklift operations	Only properly trained staff is able to operate forklift. Forklift to be inspected at the beginning of each shift. Operation of the vehicle slowly, controlled and alert required.
	Strain or crushing injury from unloading or moving heavy objects.	Use proper lifting and unloading techniques. Use proper equipment and caution when unloading or moving heavy objects. Non essential personnel to stay clear of areas where heavy objects are being moved. Wear leather gloves when moving heavy or sharp objects.
	Slip/trip/fall on uneven surfaces or debris in the work area.	Use caution and be aware of your surroundings. Maintain a clean work area. Wear steel toe work boots.
	Contusions, lacerations or strain from use of hand tools.	Use the right tools for the job. Use tools that are in good working order. Wear leather gloves and eye protection when using hand tools.
	Noise near operating machinery	Use hearing protection per "Arms Length Rule." Utilize hearing protection at all times near rigs.
	Eye irritation from blowing dust	Wear safety glasses at all times. Goggles may be required during work in windy, dusty situations.
Sampling	Fall hazards if climbing on trucks	Avoid climbing on trucks.
	Traffic and forklift traffic to and from laboratory with samples.	Coordinate work closely between all site personnel. All lift trucks must have operating backup alarm.
	Strain or crushing injury from moving heavy objects.	Use proper lifting and unloading techniques. Use proper equipment and caution when unloading or moving heavy objects. Wear leather gloves when moving heavy objects.
	Falling objects and overhead hazards.	Wear hardhat at all times. Be aware of potential overhead equipment.
	Slip/trip/fall on uneven surfaces or debris in the work area.	Use caution and be aware of your surroundings. Maintain a clean work area. Wear steel toe work boots.
	Contusions, lacerations or strain from use of hand tools.	Use the right tools for the job. Use tools that are in good working order. Wear leather gloves when using hand tools.
	Projectiles, eye irritation from blowing dust and or chemical hazards	Wear proper PPE face during sampling



Dressing	Spider's in clothing and boots	All staff to keep their uniforms and boots in the changing rooms. All staff to shake out their boots and inspect cloths prior to wearing.
Decontamination of surfaces	Exposure to chemical contaminants	Wear specified PPE. Follow site control procedures. Follow decontamination and hygiene procedures.
	Traffic hazard during mobilization of and operation of equipment	Coordinate work closely between GEM and all other on-site personnel. All heavy equipment must have operating backup alarm. All personnel must watch for traffic between buildings.
	Strain or crushing injury from unloading or moving heavy objects.	Use proper lifting and unloading techniques. Use proper equipment and caution when unloading or moving heavy objects. Non essential personnel to stay clear of areas where heavy objects are being moved. Wear leather gloves when moving heavy objects.
	Slip/trip/fall on uneven surfaces or debris in the work area. Nail stickups. And pipe hanging down	Use caution and be aware of your surroundings. Maintain a clean work area. Wear steel toe work boots and hard hats.
	Contusions, lacerations or strain from use of hand tools.	Use the right tools for the job. Use tools that are in good working order. Wear leather gloves when using hand tools.
	Noise near operating machinery	Use hearing protection per "Arms Length Rule."
	Eye irritation from dust during cleaning operation.	Wear safety glasses at all times during cleaning of petroleum and oils. Full face respirator required when cleaning areas containing metal dusts.
	Fall hazards if climbing on roll-offs	Avoid climbing on roll-offs.
Office Work	Repetitive motion injuries	Evaluate work station. Design work station to fit the individual. Vary work when possible. Take breaks. Utilize proper keyboards. Use phone headsets.
	Strain or crushing injury from moving objects.	Use proper lifting and unloading techniques. Use proper equipment and caution when unloading or moving heavy objects. Wear leather gloves when moving heavy or rough objects.
	Falling objects and overhead hazards.	Do not store heavy objects over head height. Utilize proper equipment such as ladders to reach high objects. Clear personnel from surrounding area during overhead work.
	Slip/trip/fall on uneven surfaces or debris in the work area.	Use caution and be aware of your surroundings. Maintain a clean work area. Keep file cabinet drawers closed.
TASK	RECOGNIZED HAZARD	METHOD OF MITIGATION
Prepare job site	Injury or exposure to public or other on-site personnel	Perform daily safety meeting prior to the start of work and discuss PPE requirements (hard hat, safety glasses, safety vest & safety toe boots)
		Set up exclusion zone. Maintain perimeter fencing and closed gates. Secure all potentially hazardous equipment inside the locked fenced work area and place warning barriers or covers on or around the hazardous parts.
Mobilize Equipment and Materials	On-site vehicular accident with heavy equipment/equipment maintenance	Visually inspect equipment (fire extinguisher on board, no oil or other fluid leaks, cabling and associated equipment in good condition, pressurized hoses secured with whip checks or adequate substitute, jacks in good condition, grounding as appropriate).
	Moving Equipment/Driving vehicles	Use spotters to watch for people and obstacles. No cell phone use. Wear seatbelts at all times.
	Flammable or oxygen-deficient atmosphere from accumulated vapors	Include Lower Explosive Limit (LEL) and oxygen monitoring. If $>10\% \text{ LEL}$ or $\text{O}_2 < 19.5\%$, discontinue work or ventilate area with explosion-proof equipment do not resume until levels return to safe.
	Noise	Wear hearing protection when noise levels exceed 85 db.
	Equipment failure	Perform periodic visual inspections of heavy equipment
	Fire	Have fire extinguishers available on-site



Soil Excavation	Exposure to chemical contaminants	Wear specified PPE. Monitor organic vapor levels and maintain dust control. Follow site control procedures. Follow decontamination and hygiene procedures.
	Work around heavy equipment as part of excavation, backfilling, and compaction activities.	CDLP to inspect excavation equipment for proper operation prior to starting work. Non-essential personnel to stay away from moving equipment.
	Struck by heavy equipment. Potential roll over incidents.	Heavy equipment to be equipped with "back up" warning devices. Employees on foot in operations area to wear high visibility vests. Seat belt use is mandatory when operating machinery. Operators to be informed of government environmental and biological monitors presence during operations.
	Engulfment, hazardous atmosphere, fall and struck by hazards. Underground utility damage.	Excavations greater than five feet in depth, and based on Type C Soil, will be protected by sloping, (if personnel were to enter). CFR 1926.652(a) (1). Spoil will be placed (2) feet back from edge of excavation. Excavations greater than (4) feet in depth will be provided with access ramps or ladders (secured top and bottom) to allow for no more than (25) feet of lateral travel 1926.651(c) (2). Where an excavation is left open, and fall hazard potential exists, the excavation will be temporarily fenced (orange plastic). Utilize spotter and earth probe when nearing underground utilities. Hand dig when in proximity to utility. Employees shall wear a harness with a lifeline securely attached to it when entering excavations classified as a confined space or that otherwise present the potential for emergency rescue.
	Work around an open excavation.	No entry into the excavation unless proper shoring, benching, and ramps are in place per OSHA standards.
	Traffic hazard during mobilization of and operation of equipment	Coordinate work closely between CDLP and all other on-site personnel. All heavy equipment must have operating backup alarm. All personnel must wear visibility vests.
	Strain or crushing injury from unloading or moving heavy objects.	Use proper lifting and unloading techniques. Use proper equipment and caution when unloading or moving heavy objects. Non essential personnel to stay clear of areas where heavy objects are being moved. Wear leather gloves when moving heavy objects.
	Slip/trip/fall on uneven surfaces or debris in the work area. Nail stickups.	Use caution and be aware of your surroundings. Maintain a clean work area. Wear steel toe work boots.
	Contusions, lacerations or strain from use of hand tools.	Use the right tools for the job. Use tools that are in good working order. Wear leather gloves when using hand tools.
	Noise near operating machinery	Use hearing protection per "Arms Length Rule."
	Overhead Cranes/lines	Be aware of their height and presence. Do not lift excavators higher than necessary. Wear hard hats at all times on site.
	Eye irritation from blowing dust during excavation.	Wear safety glasses at all times.
	Fall hazards if climbing on trucks	Avoid climbing on trucks.
Equipment Movement/ Set-up	Mud Pit	barricade or tape <i>immediately</i> after completion
	Loading/Unloading rig from Transport	Safe work procedure
	Obstacles - equipment, employees, and others	proper drill site organization and planning, spotters, communication
	Leveling Jacks	communication, safe work practices
	Mast Elevation	communication, visual clearance
	Ancillary Equipment Set-Up	proper manual handling, PPE, communication, safe work practices
	Air/Water Hose Connections	safe work practices, safe use of tools
	Rod Stacking	proper manual handling, PPE
	Drilling Fluid Preparation	PPE, safe work practices
Drilling Operations	Drill Bit Set-Up	communication, safe work procedure
	Rod Rotation	physical guards, visual hazard identification, training
	Other rotating hazards (belts, chains, drive lines, etc.)	physical guards, visual hazard identification, training
	Noise	engineering, administration, PPE
	Dust	engineering, administration, PPE
	Running and Pulling Drill String	safe work procedure, proper manual handling
	High Pressure Hoses	whip checks, visual inspection
	Breaking Rod Joint	safe work procedure
	Water Swivel	proper maintenance, inspection
Maintenance	Core Recovery - pulling and emptying inner tube, and assembly of inner tube and barrel	safe work procedures, PPE, training
	Down Hole Surveys/Cameras	safe work procedures, PPE, training
	Batteries - jumping, servicing	safe work procedures, training, PPE
	Tire Changing	safe work procedures, training, PPE
	Engine Maintenance	safe work procedures, training, PPE, lockout
Misc. - These types of hazards	Refueling	safe work procedures, training, PPE
	Servicing Pressure Systems	safe work procedures, training, PPE, lockout
	Night Work (visibility)	proper lighting, safe work practices
	Chemical Hazards	PPE, training, safe work practices
	Noise	engineering, administration, PPE
	Dust	engineering, administration, PPE



may be found in some or all of the operations listed above.	Working at Height	PPE, training, safe work procedures
	Equipment Fires	training, safe work procedures, safety inspections
	Welding / Cutting	PPE, training, safe work procedures
	Wire Rope	PPE, training, safe work procedures
	Housekeeping	safe work procedures, safety inspections
	Manual Handling	training, safe work procedures
	Natural Chemicals	stop work and notify a supervisor immediately

Task Specific JSA's required for this Project:

<input checked="" type="checkbox"/> Steam Cleaner Operation	<input checked="" type="checkbox"/> Rod Handling Addition and Removal
<input checked="" type="checkbox"/> Forklift Operations	<input checked="" type="checkbox"/> Mobilization and Demobilization
<input checked="" type="checkbox"/> Site Walk and Set up	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Rig set up – Full size Sonic	<input checked="" type="checkbox"/>

Drilling Operations

Drilling is considered to be a high-risk activity and is inherently dangerous. The driller is in charge of the drill rig and associated equipment. Listed below are items to be aware of when working near a drill rig:

- Stand as far back as possible from drill rig;
- Do not approach the drill rig until you have obtained eye contact and clearance from the driller;
- Never lean anything against the rig;
- Stay clear of outriggers / hydraulic jacks when they are being lowered;
- Stand well back and to the sides when rig is towering up;
- Look up and act as an extra set of eyes when driller is towering up – watch for electrical lines, trees, or any other obstruction;
- Stay clear of all rotating parts, including augers, and never reach in without communicating with the rig operator;
- Always use the company policy 'Show Your Hands' when engaging equipment;
- Always wear minimum level D PPE when working near a drill rig (hard hat, safety glasses, steel toed boots and hearing protection).

Drilling Operations Cont:

- The drill rig is not to be operated in inclement weather. (Lightening, thunderstorms etc.) – Review appropriate JSA's (attached)
- The driller is to verify that the rig is properly leveled and stabilized before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The driller is not to drive the rig with the mast in the raised position.
- The driller must check for overhead power lines before raising the mast. A minimum distance of 10 feet between mast and overhead lines (<50 kV) is required. Increased separation may be required for lines greater than 50 kV.
- Personnel should stand clear before rig startup.
- The driller is to verify that the rig is in neutral when the operator is not at the controls.
- Become familiar with the hazards associated with the drilling method used (cable tool, air rotary, hollow-stem auger, etc.).
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts.
- Do not smoke or permit other spark-producing equipment around the drill rig.
- The drill rig must be equipped with a kill wire or switch, and personnel are to be informed of its location.
- Be aware and stand clear of heavy objects that are hoisted overhead.
- The driller is to verify that the rig is properly maintained in accordance with the drilling company's maintenance program.
- The driller is to verify that all machine guards are in place while the rig is in operation.
- The driller is responsible for housekeeping (maintaining a clean work area).
- The drill rig should be equipped with at least one fire extinguisher.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig, and stay as far away as possible. Notify emergency personnel immediately

1. Review the Material Safety Data Sheets (MSDSs) for the materials which are expected to be utilized

- MSDS are located in the CDLP drilling rigs & support vehicles**
- Attach MSDS's to this safety plan.
- Ensure that appropriate spill response materials are present (e.g., absorbent media for oil, neutralizing agents for potassium permanganate, secondary containment for larger chemical tanks).
- Operate and maintain pressure vessels, pumps and hosing in accordance with the manufacturer's recommendations.
- Do not exceed the rated pressure of the vessels and associated piping or hoses of the system.
- The system must be provided with a pressure relief valve/controller that safely reduces the system pressure to within the system rated pressure.



- The pressure relief valve must be rated at no more than 110% the rated pressure of the system and must be tested at regular intervals.
- For PPE and air monitoring requirements, refer to the PPE section and Site Monitoring section of this plan. PPE shall be used to minimize potential exposure to identified site contaminants of concern and injection solutions during site injection operations. In addition, good personal hygiene practices and procedures must be practiced.
- Use face shields in combination with safety goggles when the potential for exposure to chemical splashes may exist. Additional respiratory protection may be required depending on the chemicals being used.
- Drums shall be moved using a drum "dolly" or other appropriate material handling equipment where the weight of the drum can be properly managed and secured during the movement.
- Empty containers may require special preparation/rinsing prior to disposal. Verify requirements with the project Environmental Manager.
- Appropriate spill response materials for all chemicals must be present at the job site. Only qualified (by training and previous experience) who have proper PPE and equipment available shall provide spill response operations.
- Verify the any cam-lock fitting on the injection hose/piping, well head, or direct push technology (DPT) rods are structurally sound and free of defects. Where hoses are used, ensure fittings have been secured to the hose surface via mechanical banding equipment to prevent whipping.
- When Drilling or lines pressurized, stand at a sufficient distance (i.e. ~ 20 feet) from the well head/point. Keep unessential project personnel away from the drilling system, array, and well head(s) during drilling operations.
- Remove/stow all unnecessary equipment and material in the area.
- When drill rig is not in use, components must be properly secured, de-energized, or stowed. If the system will operate without an attendant, plans for operating unattended must be in place and approved by the PM.
- All pressurized lines and fittings should be 'tethered' or otherwise secured to minimize whipping or 'launching' of lines in the event of an equipment failure. Any "quick connect" type fittings (compressed air or fluid) should be secured with appropriate pins, clips to prevent accidental disengagement of the fitting during operation.
- Inspect all equipment, hoses, pressure lines, and fittings daily and prior to pressurizing.

Chemical Storage

- Some chemicals, such as strong oxidizers, may have stringent storage requirements per local or National Fire Codes. Verify that appropriate storage provisions are in place prior to starting work.
- **NOTE:** Counties and cities may have requirements specific to storing these chemicals. Also, storage and use of certain chemicals such as potassium permanganate and hydrogen peroxide may be subject to the new Chemical Facility Anti-Terrorism Standards of the Department of Homeland Security – the applicability depends on the chemical, quantity/concentration, and type of facility. Please contact the project Safety Manager to determine whether chemicals are subject to these standards.
- Chemicals must be stored in a designated, secured area with spill prevention capabilities. Review MSDS or other information to determine potential incompatible materials. Incompatible materials shall not be stored together. Ensure all containers are labeled.

Substrates that may create reducing conditions while drilling (Methane & H2S)

Methane

Drilling in or near a landfill can result in release and exposure to methane gas. Methane gas is colorless, odorless, it is also flammable & highly explosive. **A photoionization detector (PID) is required when methane is present or concentrations are predicted to be at an unsafe level.** Methane is a colorless, odorless gas with a wide distribution in nature. Methane is created when organic matter decomposes (rots) without any oxygen present ("anaerobic" decomposition) and is common in landfills, marshes, septic systems and sewers.

Methane may be produced as a by-product of the biological process when biological additives are used in a remediation process (such as when emulsified oil is injected to enhance dechlorination of contaminated groundwater).

Experience has shown that **methane** may be present in the well space following a drilling, injection or development task, once the biological process has had time to progress. This needs to be considered when returning to collect ground water samples. Although methane degrades Engineering controls shall be considered to bring the concentrations of methane down to an acceptable level in the breathing zone.

Methane is a "simple asphyxiant," which means that it can displace available oxygen. Methane is combustible and mixtures of methane with air are explosive within the range 5-15% by volume of methane (the lower and upper explosive limits). At room temperature, methane is lighter than air, so in an outdoor environment, it tends to dissipate.

Methane is not toxic when inhaled, but it can produce suffocation by reducing the concentration of oxygen inhaled. **When exposed to concentrations high enough to displace oxygen, you may experience dizziness, deeper breathing, possible nausea and eventual unconsciousness. The primary danger is from fire and explosion, so ensure that you work in a well-ventilated area, and that there is no source of ignition present.** Use spark-proof tools and intrinsically safe equipment, if necessary. If working in a confined space, make sure that appropriate controls are in place and follow an approved permit-required confined space entry plan.

H₂S as a Project Hazard

Elevated levels of H₂S have not been reported during normal drilling activities, but experience has shown that high levels of H₂S may be present in the well space and in the breathing zone following a Drilling task, Soil or water sample, Injection & even well development. Once the biological process has had time to



progress & becomes a potential hazard. Engineering controls shall be considered to bring the concentrations of H₂S down to an acceptable level in the breathing zone, followed by administrative controls, respiratory protection and, if necessary **STOP WORK**.

ACTION LEVELS FOR CONTAMINANT MONITORING

Not Applicable for This Project:

Site workers must notify the site health and safety coordinator immediately in the event of any injury, or if signs or symptoms of overexposure to hazardous substances are exhibited. Specific hazardous substances expected at the site and action levels are identified and listed below.

	Parameter	Monitoring Instrument	Monitoring Frequency	Action Level/Criteria	Specific Action
<input type="checkbox"/>	Oxygen	Oxygen meter or tri/quad gas meter with oxygen sensor	Continuously ¹	>25%	Fire hazard potential. Discontinue investigation. Consult the H&S Officer.
				19.5%-25%	Continue investigation with caution. Deviation from normal level (21-22%) may be due to presence of other substances.
				<19.5%	Cease work and evacuate area. Contact PM and office HSC for further options. Upgrade PPE to Level B if investigation is authorized to continue. NOTE: Combustible gas readings are not valid in atmospheres with <19.5% oxygen
<input type="checkbox"/>	Combustible Gas or Vapor	Combustible gas meter - % LEL	Continuously	<10% LEL	Continue investigation.
				10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
				>25% LEL	Explosion hazard. Withdraw from area immediately.
<input type="checkbox"/>	Methane	Combustible gas meter - % LEL	Continuously	<10% LEL	Continue investigation.
				10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
				>25% LEL	Explosion hazard. Withdraw from area immediately.
<input type="checkbox"/>	Volatile Organic compounds	PID/FID	Continuously	If the PID/FID reading is _____ (in breathing zone) ²	Cease work and upgrade to Level C if authorized by the HASP and appropriate for the contaminant. Proceed with work cautiously and continue air monitoring. Contact PM and Office HSC for further options as necessary and for all conditions requiring Level B.
<input type="checkbox"/>	Particulate	Real-time Dust Meter	Continuously	If the Dust Meter is _____ (in breathing zone) ³	

NOTE:

- ¹ This means at least four times an hour or whenever conditions change.
- ² The action level should be established on each site based on the contaminants present and should be set at one-half of the lowest published standard. Be careful that the PID will measure the contaminant and compensate for how well the contaminant is measured (see manufacturer data). Specific action is required if four consecutive readings reach the action level. Breathing zone is defined as the hemisphere forward of the shoulders with a radius of six to nine inches.
- ³ These thresholds can be established by extrapolation from soil concentrations and should be the lesser of 5 mg/m³ as respirable dust or the extrapolated threshold. Specific action is required if four consecutive readings reach the action level.

4. IN ANY EVENT THE THRESHOLD EXCEEDS THE ACTION LEVEL CRITERIA, WORK WILL CEASE & CREW WILL VACATE AREA

- Chemical Exposure Information attached as Appendix (MSDS attached when required & or requested)



Utility Clearance

- Confirm that both a private utility locate company *and* the public one call Utility Notification Center have been notified. Confirm that all utility companies that are known to have underground utilities in the area have been to the site and have marked utilities with the appropriate color marking paint. Walk site to observe private utility locator markings. Best practices for utility location involve use of Vac/Air Knife for utility clearance. Confirm that all boring locations are a minimum of three (3) feet from any underground utility locate mark, measured from closest edge of boring to closest edge of utility, per CDLP policy. **Boring locations must be a minimum of ten (10) feet from any natural gas (yellow) lines.**
- Review any available as-built plans for underground utility locations. Discuss locating ductile vs non-ductile utilities with client. Non-ductile utilities are much more difficult to locate and require additional procedures frequently overlooked. Check with client for any company-specific conditions that may be more restrictive. Stop Work and call CDLP Operations before beginning a boring closer than the minimum allowed distances, as it may be possible to obtain a waiver if the utility can be exposed.
- Always look overhead to make sure there are no overhead electrical power lines, trees, canopies, roof- line extensions, or other overhead obstructions. Equipment, including drill rig mast, may not be any closer than a minimum of 15 feet from electrical utility lines (20 ft. if 200 - 350 kv; 25 ft. if 350 - 500 kv; 35 ft if 500 – 750 kv; and 45 ft if over 750 kv). Check with utility company if in doubt. Be aware of the potential for electrical arcing.

American Public Works Association's Uniform Color Code (for utilities) on following page.
American Public Works Association (AWPA) Uniform Color Code

RED	<i>Electric power lines, cables or conduits, and lighting cables.</i>
YELLOW	<i>Gas, oil, steam, petroleum or other hazardous liquid or gaseous materials.</i>
ORANGE	<i>Communications, cable TV, alarm or signal lines, cables, or conduits.</i>
BLUE	<i>Water, irrigation, and slurry lines.</i>
GREEN	<i>Sewers, storm sewer facilities, or other drain lines.</i>
WHITE	<i>Proposed excavation</i>

Excavation:

- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.
- Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping. Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.
- Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.
- Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.
- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth. Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 10 percent of the lower flammable limit.
- Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.
- If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.



- If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with paragraphs (h)(1) and (h)(2) of this section.
- Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.
- Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.
- Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety. **Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless CDLP uses one of the other OSHA approved options.**

Truck & Rig Loading: All truck drivers will remain in their cabs with the windows closed and ventilation systems off while being loaded and in the exclusion zone.

Training Requirements:

All assigned employees are required to familiarize themselves with the contents of this safety plan and all JSA's and MSDS's before starting a work activity and review it with their Supervisor during their Daily Safety Meeting.

HEALTH AND SAFETY CLEARANCE (letter & certification can be provided upon request)

Cascade employees as well as subcontractor employees assigned to perform field activities covered by this procedure must have active health and safety clearance statuses. This means that during the past 12 months, they have been cleared by a physician to wear respirators and perform their field assignments and have satisfied health and safety training requirements specified in 29 CFR 1910.120(e).

ONSITE CONTROL

(in compliance with 29 CFR 1910.120(b)(4)(ii)(F) and 29 CFR 1910.120(d))

This site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft. The site control program includes the elements specified in 29 CFR 1910.120(d) and provides the following site-specific information:

- Site map or description, indicating site perimeter and work zones
- site access procedures
- site security
- site work zones including standard operating procedures
- use of the buddy system
- both internal (on-site) and external communications

No unauthorized person shall be within the work area. Visitors must sign in with the On-site supervisor or his/her designated representative.

The Project Manager has been designated to coordinate access control and security on site unless delegated by the Project Manager to another person or group of persons.

Security at this site is maintained during both working hours and non-working hours to prevent:



unauthorized entry; removal of contaminated material from the exclusion zone (except for approved disposal); exposure of unauthorized, unprotected people to site hazards; vandalism and theft.

1. All entry to the site is through a guarded security gate. Security is maintained in the Support Zone and at Access Control Points to ensure only authorized entrants access the site. Only those persons on the authorized list will be allowed into the area. Trucks will enter through another gate.
2. A fence is erected around the perimeter of the site to prevent unauthorized entry or exit.
3. All equipment will be locked and secured when not in use.

MATERIAL SAFETY DATA SHEETS

Under the Hazard Communication regulations, OSHA requires that Material Safety Data Sheets (MSDS) be available to employees for potentially harmful substances handled in the workplace. An MSDS documents information about the properties of a particular substance, such as physical data (e.g., melting point, boiling point, solubility, etc.), toxicity, health effects, first aid, and handling procedures. The purpose of the MSDS is to provide employees with procedures for working with a substance in a safe manner.

If potentially harmful substances will be handled during this project, the appropriate MSDS must be attached to this HASP.

Substance	Attached?	Substance Use
Alconox/Liquinox	<input type="checkbox"/>	Phosphate soap used for decontamination purposes
Carbon Dioxide	<input type="checkbox"/>	Compressed gas used for air supply to pneumatic/bladder pumps
Gasoline	<input type="checkbox"/>	Fuel for field vehicles and generators
Hexane	<input type="checkbox"/>	May be used for decontamination of equipment
AutoCal Solution	<input type="checkbox"/>	Used to calibrate multi-parameter Horiba instruments
Hydrochloric Acid	<input type="checkbox"/>	Preservative for sample bottles for volatile organic compound analysis
Hydrogen Sulfide	<input type="checkbox"/>	Gas found on landfills, coal mines, and petroleum facilities
Isobutylene	<input type="checkbox"/>	Calibration gas for photoionization detector
Isopropanol	<input type="checkbox"/>	May be used for decontamination of equipment
Methane	<input type="checkbox"/>	Decomposition of waste material
Methanol	<input type="checkbox"/>	Preservative for soil sample bottles
Nitric Acid	<input type="checkbox"/>	Preservative for sample bottles for metals analyses
Nitrogen	<input type="checkbox"/>	Compressed gas used for air supply to pneumatic/bladder pumps
Sodium Hydroxide	<input type="checkbox"/>	Preservative for sample bottles for sulfide and cyanide analyses
Sodium Thiosulfate	<input type="checkbox"/>	Preservative for sample bottles for coliform and related analyses
Sulfuric Acid	<input type="checkbox"/>	Preservative for sample bottles for various inorganic analyses
Zinc Acetate	<input type="checkbox"/>	Preservative for sample bottles for sulfide analysis
Other	<input type="checkbox"/>	Fuel Oil
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

PERSONAL SAFETY EQUIPMENT & TRAINING REQUIREMENT SUMMARY

<u>Personal Protective Equipment (PPE) & Additional Equipment Required</u>		
PPE/ Equipment	Required?	Notes:
Hard Hat	<input checked="" type="checkbox"/>	
Eye Protection	<input checked="" type="checkbox"/>	Goggles and face shield if handling liquids
Steel Toe Boots	<input checked="" type="checkbox"/>	
Hearing Protection	<input checked="" type="checkbox"/>	
Hi-Vis Vest	<input checked="" type="checkbox"/>	
Face Protection	<input type="checkbox"/>	
TYVEK Suit	<input type="checkbox"/>	Poly tyvek during chemical handling
Gloves	<input checked="" type="checkbox"/>	Nitrile when handling chemicals
Fall Protection	<input type="checkbox"/>	
Life Preserver (PFD)	<input type="checkbox"/>	
Cold Weather Gear	<input type="checkbox"/>	

<u>Training Requirements</u>		
Training Program	Required?	Staff Requiring Training
Health & Safety Orientation	Yes	
OSHA 10-hr Construction Safety		
First Aid/CPR	<input checked="" type="checkbox"/>	
OSHA HAZWOPER (40 Hr)	<input type="checkbox"/>	
MSHA Part 48 - Surface	<input type="checkbox"/>	
MSHA Part 48 - Underground	<input type="checkbox"/>	
MSHA Part 46 - Surface	<input type="checkbox"/>	
Confined Space Entry	<input type="checkbox"/>	
Fall Protection	<input checked="" type="checkbox"/>	
Respirator Fit Testing	<input checked="" type="checkbox"/>	
Transporting Hazardous Materials and Dangerous Goods	<input type="checkbox"/>	



Fire Resistant Clothing (FRC)	<input type="checkbox"/>	
Additional Communication	<input type="checkbox"/>	
Dosimeter(Badge)	<input type="checkbox"/>	
Headlamp	<input type="checkbox"/>	
Boots (other)	<input type="checkbox"/>	
Bear Spray	<input type="checkbox"/>	
Air Monitoring Equipment	<input type="checkbox"/>	02 / CO
Fire Extinguisher	<input checked="" type="checkbox"/>	
First Aid Supplies	<input checked="" type="checkbox"/>	
Whistle/ Air horn	<input type="checkbox"/>	
Washing Facilities	<input checked="" type="checkbox"/>	Eye wash
Drinking Water	<input checked="" type="checkbox"/>	
Full Face Respirator	<input checked="" type="checkbox"/>	
Wheel Chocks	<input checked="" type="checkbox"/>	
Sunblock	<input checked="" type="checkbox"/>	

Personal and Medical Monitoring

The following personal monitoring will also be in effect on site.

Heat and Cold Stress Monitoring: If it is determined that heat stress monitoring is required (mandatory if (over 70 degrees Fahrenheit) the following procedures shall be followed.

1.0 INTRODUCTION

The purpose of this operating procedure is to provide general information on heat stress and the methods that can be utilized to prevent or minimize the occurrence of heat stress. Adverse climatic conditions must be considered when planning and conducting site operations. Ambient temperature effects can include physical discomfort, reduced efficiency, personal injury, decreased response time, and increased accident probability.

1.1 TYPES OF HEAT STRESS

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses that threaten employees at project field sites, regular monitoring and other preventative measures are vital. Site workers must learn to recognize and treat the various forms of heat stress.

The best approach is preventive heat stress management. In general many or all of the following are guidelines to prevent heat stress:

- Have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable 4 ounce cups, and water that is maintained at 50-60°F. Urge workers to drink 1-2 of these cups of water every 20 minutes, for a total of 1-2 gallons per day. Provide a cool, preferable air-conditioned area for rest breaks. Discourage the use of alcohol in non-working hours, and discourage the intake of coffee during working hours as these may increase water loss from body. Monitor for signs of heat stress;
- Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities;
- Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. An example of cooling aid is long cotton underwear which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing;
- Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing;
- In hot weather, conduct field activities in the early morning or evening;
- Ensure that adequate shelter is available to protect personnel against heat, as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of both heat and cold stress. If possible, set up a rest area in the shade;
- In hot weather, rotate shifts of workers wearing impervious clothing;
- Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

3.0 HEAT RASH

Client-specific Emergency Procedures	<input type="checkbox"/>	
Boat Safety	<input type="checkbox"/>	
Helicopter Safety	<input type="checkbox"/>	
Fall Protection	<input type="checkbox"/>	
Nuclear Gauge	<input type="checkbox"/>	
Client Specific	<input type="checkbox"/>	
High Altitude sickness	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	



Heat rash is caused by continuous exposure to heat and humid air and aggravated by chafing clothes. The condition decreases ability to tolerate heat.

Symptoms: Mild red rash, especially in areas of the body in contact with protective gear.

Treatment: Decrease amount of time in protective gear, and provide powder to help absorb moisture and decrease chafing.

4.0 HEAT CRAMPS

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

Symptoms: Acute painful spasms of voluntary muscles; e.g., abdomen and extremities.

Treatment: Remove victim to a cool area and loosen clothing. Have patient drink 1-2 cups of water immediately, and every 20 minutes thereafter, until symptoms subside. Total water consumption should be 1-2 gallons per day. Consult with physician.

5.0 HEAT EXHAUSTION

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and person may vomit, and may be dizzy.

Treatment: Remove the person to a cool, air conditioned place, loosen clothing, place in a head-low position, and provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink 1-2 cups of water immediately, and every 20 minutes thereafter, until symptoms subside. Total water consumption should be about 1-2 gallons day.

6.0 HEAT STROKE

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of heat regulating mechanisms of the body - the individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms: Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature, rapid respiratory and pulse rate; unconsciousness or coma.

Treatment: Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool but not cold water, sponge the body with cool water, or pour water on the he body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. If victim is conscious, have him drink 1-2 cups of water. Never give liquids to an unconscious victim.

7.0 HEAT STRESS MONITORING AND WORK CYCLE MANAGEMENT

For strenuous field activities that are part of on-going site work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing protective clothing.

Measure Heart Rate (HR). HR should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats/minute.

Manage Work/Rest Schedule. The following work/rest schedule can be used as a guideline.

<u>Adjusted Temperature</u>	<u>Active Work Time (min/hr)</u>
<75	50
80	40
85	30
90	20
95	10
100	0

Calculate the adjusted temperature:

$T \text{ (adjusted)} = T \text{ (actual)} + (13 \times \text{fraction sunshine})$

Measure the air temperature with standard thermometer. Estimate fraction of sunshine by judging what percent the sun is out: 100% sunshine = no cloud cover = 1.0; 50% cloud cover = 0.5; 0% sunshine = full cloud cover = 0.0).



Reduce or increase the work cycle according to the guidelines under heart rate.

In addition to the normal medical monitoring procedures (as outlined in 29 CFR 1910.120) to which all field personnel must adhere, the following medical monitoring procedures are implemented for this project. State none, if no additional medical monitoring is deemed necessary. None

All personnel will have the required training. Additionally, all personnel and personnel working in the exclusion zone will have OSHA 40 hour Hazwoper training and current 8 hour refresher. Truck drivers who will be waiting in their cab with the windows closed will not be required to be OSHA 40 hour trained unless air monitoring shows levels above the PEL in the loading area. All equipment operators will be trained as per OSHA requirements

In addition to the normal medical monitoring procedures (as outlined in 29 CFR 1910.120) to which all field personnel must adhere (described in the Corporate Health and Safety Plan), the following medical monitoring procedures are implemented for this project. State none, if no additional medical monitoring is deemed necessary. None

Cold Stress

Exposure to moderate levels of cold can cause the body's internal temperature to drop to a dangerously low level, causing hypothermia. Symptoms of hypothermia include slow, slurred speech, mental confusion, forgetfulness, memory lapses, lack of coordination, and drowsiness.

To prevent hypothermia, site personnel will stay dry and avoid exposure. Site personnel will have access to a warm, dry area, such as a vehicle, to take breaks from the cold weather and warm up. Site personnel will be encouraged to wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypropylene), if applicable. Personnel will wear water-protective gear, such as rain coats and pants, during sediment sampling to avoid getting clothing wet. Site personnel will keep hands and feet well protected at all times. The signs and symptoms and treatment for hypothermia are summarized below.

- Signs and Symptoms

- Mild hypothermia (body temperature of 98–90°F)
 - Shivering
 - Lack of coordination, stumbling, fumbling hands
 - Slurred speech
 - Memory loss
 - Pale, cold skin
- Moderate hypothermia (body temperature of 90–86°F)
 - Shivering stops
 - Unable to walk or stand
 - Confused and irrational
- Severe hypothermia (body temperature of 86–78°F)
 - Severe muscle stiffness
 - Very sleepy or unconscious
 - Ice cold skin
 - Death

- Treatment of Hypothermia—Proper Treatment Depends on the Severity of the Hypothermia

- Mild hypothermia
 - Move to warm area.
 - Stay active.
 - Remove wet clothes and replace with dry clothes or blankets and cover the head.
 - Drink warm (not hot) sugary drinks.
- Moderate hypothermia
 - All of the above, plus:
 - call 911 for an ambulance.
 - cover all extremities completely.
 - place very warm objects such as hot packs or water bottles on the victim's head, neck, chest, and groin.
- Severe hypothermia
 - Call 911 for an ambulance.
 - Treat the victim very gently.
 - Do not attempt to re-warm—the victim should receive treatment in a hospital.

- Frostbite

Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30°F or lower, wind chill factors can allow frostbite to occur in above-freezing temperatures. Frostbite typically affects the extremities, particularly the feet and hands. Frostbite symptoms include cold, tingling, stinging, or aching feeling in the frostbitten area followed by numbness and



skin discoloration from red to purple, then white or very pale skin. Should any of these symptoms be observed, wrap the area in soft cloth, do not rub the affected area, and seek medical assistance. Call 911 if the condition is severe.

- **Protective Clothing**

Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- Wear *at least three layers* of clothing.
 - An outer layer to break the wind and allow some ventilation (like Gortex or nylon).
 - A middle layer of down or wool to absorb sweat and provide insulation even when wet.
 - An inner layer of cotton or synthetic weaves to allow ventilation.
- Wear a hat—up to 40 percent of body heat can be lost when the head is left exposed.
- Wear insulated boots or other footwear.
- Keep a change of dry clothing available in case work clothes become wet.
- Do not wear tight clothing—loose clothing allows better ventilation.

Work Practices

- Drinking—drink plenty of liquids, avoiding caffeine and alcohol. It is easy to become dehydrated in cold weather.
- Work Schedule—if possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold in heated vehicles.
- Buddy System—Try to work in pairs to keep an eye on each other and watch for signs of cold stress.

FIELD SAFETY PROCEDURES CHANGE AUTHORIZATION

This Safety Procedures Change Authorization Form will be completed and signed before any safety procedures identified in this Site Safety Plan can be modified by the Field Team. All revisions to safety procedures must be approved by the Project Manager.

Change

Number:

Date:

Duration of Task to be changed:

Description of Procedures

modification: _____

Justification: _____

Person Requesting Change:

Name: _____

Title: _____

Signature: _____

Verbal Authorization Received From:

Name: _____

Title: _____

Approved by:

(Signature of person named above to be obtained within 48 hours of verbal authorization)



INCIDENT REPORT FORM

Cascade Drilling, LP Incident Investigation

IMPORTANT: Do not include any personal non-work related medical information on this form

PART 1: ADMINISTRATIVE INFORMATION	
Incident Designation:	Division:
Regional Safety Manager:	Office Location:
Employee Name:	Job Number/Name:
Incident Location:	

PART 2: INCIDENT DESCRIPTION	
Loss Type:	Severity:
Date/Time Occurred: 19T	Date Submitted to Corporate: 19T
WHAT HAPPENED? Describe how the mishap occurred; include what the person(s) was doing, trying to do and anything unusual. Include pictures if possible.	

Summary (1-2 sentences. Provide brief description of the incident. Provide facts only, no speculation or opinion):

Loss Details (Brief factual details of what, where, when; include photos, sketches, etc. as attachments):

Immediate Corrective Actions Taken:

LOSS INVOLVED			
Post-incident alcohol or drug test performed:		WorkCare Informed:	
WITNESSES - IF THIRD PARTY INVOLVED - ADDRESS AND PHONE NUMBER:			
INCIDENT WITNESSES	Names (s)	Addresses/Company	Phone

LOSS CONSEQUENCE DETAILS

(This portion of the form serves to document the actual consequences of a Loss Incident and should be completed only after loss consequences have been identified and finalized and any investigation(s) including any governmental investigation(s) have been completed.)

OSHA RECORDABLE:	DOT RECORDABLE:
Incident Cost Category:	Additional Cost Category if Applicable:



SERIOUS INJURY OR FATALITY (SIF): No		If yes, clarify: _____
<p>Was this loss a SIF or could it have reasonably resulted in a SIF? A potential SIF is defined as likely to have caused an injury resulting in significant physical body damage with probable long term and/or life altering complications? Examples of SIFs include: amputations; significant and/or multiple fractures; severe laceration; third-degree burns; disfigurement; loss/impairment of body organ function; complete loss of hearing; visual impairment to total blindness; confirmed, debilitating ergonomic; or serious injury cases.</p>		

IF THE LOSS INVOLVED A FIRE OR EXPLOSION, COMPLETE THE FOLLOWING:													
Ignition Source: _____		Comments: _____											
IF THE LOSS IS AN INJURY OR ILLNESS, COMPLETE THE FOLLOWING:													
Severity Level: _____		Type of Injury/Illness: _____											
EVENT LEADING TO INJURY / ILLNESS: _____		<input type="checkbox"/> Caught In, Under, Between		<input type="checkbox"/> Drowning									
Body Position/Force:		Chemical Exposure:		Falls:									
<input type="checkbox"/> Line of Fire <input type="checkbox"/> Overexertion, Strain <input type="checkbox"/> Struck Against Object <input type="checkbox"/> Struck By Object <input type="checkbox"/> Personal Energy <input type="checkbox"/> Repetitive Strain Injury (RSI) <input type="checkbox"/> Buried		<input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Physical Contact		<input type="checkbox"/> Fall, From Elevation <input type="checkbox"/> Fall, Same Level <input type="checkbox"/> Slip or Trip Without Fall									
Contact By:		Transportation Incident		Other (describe): _____									
<input type="checkbox"/> Noise <input type="checkbox"/> Other Physical Agents <input type="checkbox"/> Radiation <input type="checkbox"/> Temperature Extremes													
BODY PART AFFECTED:		<input type="checkbox"/> Calf/Shin <input type="checkbox"/> Central Nervous <input type="checkbox"/> Chest <input type="checkbox"/> Circulatory / Blood <input type="checkbox"/> Abdomen/Groin <input type="checkbox"/> Ankle <input type="checkbox"/> Back/Spine		<input type="checkbox"/> Ear <input type="checkbox"/> Elbow <input type="checkbox"/> Eye <input type="checkbox"/> Face <input type="checkbox"/> Fingers <input type="checkbox"/> Foot		<input type="checkbox"/> Forearm <input type="checkbox"/> Hand <input type="checkbox"/> Hip <input type="checkbox"/> Internal Organs <input type="checkbox"/> Jaw		<input type="checkbox"/> Knee <input type="checkbox"/> Neck <input type="checkbox"/> Nose <input type="checkbox"/> Respiratory <input type="checkbox"/> Ribs <input type="checkbox"/> Scalp		<input type="checkbox"/> Shoulder <input type="checkbox"/> Skull <input type="checkbox"/> Thighs <input type="checkbox"/> Toes <input type="checkbox"/> Tongue		<input type="checkbox"/> Tooth / Teeth <input type="checkbox"/> Upper arm <input type="checkbox"/> Urinary <input type="checkbox"/> Wrist	
FIRST AID TREATMENT PROVIDED:		<input type="checkbox"/> Cleaning/flushing/soaking wounds on skin surface <input type="checkbox"/> Drilling fingernail/toenail (to relieve pressure) or draining fluid from blister <input type="checkbox"/> Drinking fluids for relief of heat stress <input type="checkbox"/> Massages (not physical therapy/chiropractic treatment)		<input type="checkbox"/> Non-prescription medication at non-prescription strength <input type="checkbox"/> Removing foreign bodies from eye by irrigation or cotton swab <input type="checkbox"/> Removing splinters or foreign material from areas other than eye by simple means (e.g. tweezers)		<input type="checkbox"/> Using wound coverings (e.g. bandages, gauze pads) or butterfly bandages or steri-strips <input type="checkbox"/> Using eye patches <input type="checkbox"/> Using finger guards <input type="checkbox"/> Using hot or cold therapy (e.g. compresses) <input type="checkbox"/> Using temporary immobilization devices during transport							
Treatment Location: _____		Body Position Affected: _____											
Project Duration: _____		Short Service Worker?: _____											
LOST TIME or RESTRICTED WORK (as prescribed by a licensed health care professional)		START DATE		# OF ESTIMATED DAYS	# OF ACTUAL DAYS	Reassigned:							

IF THE LOSS INVOLVED A SPILL OR RELEASE TO THE ENVIRONMENT, COMPLETE THE FOLLOWING:							
Material Released: _____		Amount Released: _____			Spill Exposure: _____		
Event(s) Leading to Spill:		<input type="checkbox"/> Inadequate/Lack of Maintenance <input type="checkbox"/> Instrument/Control System Failure <input type="checkbox"/> Leak - Line/Piping <input type="checkbox"/> Leak - Other <input type="checkbox"/> Leak - Tank <input type="checkbox"/> Maintenance Error <input type="checkbox"/> Malfunction <input type="checkbox"/> Material or Welding Defect <input type="checkbox"/> Natural Disaster <input type="checkbox"/> No Work Procedure or Work Procedure Deficiency <input type="checkbox"/> Other (Not in List)			<input type="checkbox"/> Overfill/Overpressure <input type="checkbox"/> Pipeline Failure <input type="checkbox"/> Procedure - Failure to Follow <input type="checkbox"/> Process Upset <input type="checkbox"/> Startup/Shutdown <input type="checkbox"/> Structural Deficiency/Damage <input type="checkbox"/> Tank Failure <input type="checkbox"/> Third Party Cause <input type="checkbox"/> Transportation Accident <input type="checkbox"/> Wear <input type="checkbox"/> Other (describe): _____		

 Outside Operating Envelope

	<input type="checkbox"/> Outside Operating Envelope	
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IF THE LOSS IS PROPERTY DAMAGE, COMPLETE THE FOLLOWING:

Property Damaged: []	Description of Damage: []
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AUTHORITIES NOTIFIED	DATE / TIME:	AGENCY:	NAME / JOB TITLE:	RESPONSE (ATTACH ADDITIONAL INFO / NOTIFICATION REPORTS)
	[]	[]	[]	[]
				[]

IF THE LOSS INVOLVED MOTOR VEHICLE ACCIDENTS:VEHICLE OWNERSHIP: Company Vehicle Personal Vehicle Pool Car/Truck Rental

VIN: []	License Plate Number: []	Vehicle Type (e.g. car, utility vehicle, van): []	Vehicle Make (e.g. Chevrolet, Toyota): []
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Accident Type - Select the most appropriate one

<input type="checkbox"/> Collision - Backing	<input type="checkbox"/> Engine Failure	<input type="checkbox"/> Hit and Run	<input type="checkbox"/> Side Impact
<input type="checkbox"/> Collision - General	<input type="checkbox"/> Explosion	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Side-Swipe
<input type="checkbox"/> Collision - Head On	<input type="checkbox"/> Fire	<input type="checkbox"/> Object Fell On/Thrown	<input type="checkbox"/> Sinking
<input type="checkbox"/> Collision - Rear End	<input type="checkbox"/> Firearms/Shot At	<input type="checkbox"/> Properly Parked	<input type="checkbox"/> Stranding/Grounding
			<input type="checkbox"/> Other: _____

Route Condition - Select all that apply

<input type="checkbox"/> Curve and Downgrade	<input type="checkbox"/> Dry	<input type="checkbox"/> Oil / Chemical Covered	<input type="checkbox"/> Straight and Hillcrest
<input type="checkbox"/> Curve and Hillcrest	<input type="checkbox"/> Flooding	<input type="checkbox"/> Ruttet / Washboard	<input type="checkbox"/> Straight and Level
<input type="checkbox"/> Curve and Level	<input type="checkbox"/> High Winds	<input type="checkbox"/> Snow / Slush	<input type="checkbox"/> Straight and Upgrade
<input type="checkbox"/> Curve and Upgrade	<input type="checkbox"/> Icy	<input type="checkbox"/> Straight and Downgrade	<input type="checkbox"/> Wet

PART 3: LOSS INVESTIGATION FINDINGS AND REPORT QUALITY REVIEW

Date investigation started: 19T

INVESTIGATION SUMMARY: Determine and list by number what behaviors and/or conditions may have contributed to the Loss. Then, use the "5-Why Technique" for each of these behaviors/conditions; provide a narrative for each that explains how the associated root cause(s) was determined.

SUMMARY

(1-2

sentences): []

Question: []

**ROOT CAUSE(S) AND SOLUTION(S): HOW TO REDUCE POSSIBILITY OF INCIDENT RECURRING**

Selection of RCs and solutions reflects the analysis of investigation team and is not meant to be a legally binding conclusion as to the RC and/or solution.

REASON #	ROOT CAUSE # (1/line)*	SOLUTION(S) (must match Root Cause)	PERSON RESPONSIBLE	TARGET COMPLETION DATE	ACTUAL COMPLETION DATE

INVESTIGATION TEAM

JOB TITLE	COMPANY	DATE

QUALITY REVIEW Were the correct root cause(s) identified? Do root cause(s) and solution(s) match? Are solution(s) feasible / maintainable?

Job Title :	Company :
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PART 5: ATTACHEMENTS (Photos, Sketches, Newspaper Articles, MVA / Agency Reports, etc.)

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INCIDENT REFERENCE TABLE

INCIDENT LEVEL ¹	I	II	III	IV
CATEGORY				
INJURY OR ILLNESS	Self-Treatment. No outside consultation. (OFA)	On Site Emergency Responder assistance (First Aid). Doctor First Aid. (DFA)	OSHA Recordable. Include note here. NOV or citation without a penalty. (OSHA)	OSHA Lost Time (Days Away From Work). Fatality. NOV or citation resulting in a penalty. (OSHA+)
NEAR MISS	Potential Cost of <\$1,000. Potential OFA. Potential ignition - no charge or static spark. Potential negative client feedback.	Potential Cost of \$1,000-\$25,000. Potential DFA. Verbalized negative Client feedback, undocumented. Potential ignition source - spark or static.	Potential Cost of \$25,000-\$100,000. Potential OSHA. Potential ignition source, uncontrolled vapor or combustible. Potential Client feedback and stop work.	Potential Cost of >\$100,000. Potential OSHA, Stop Work, and penalties. Identified ignition source, uncontrolled vapor or combustible. Potential Client removal from site.
FIRE/EXPLOSION	Not applicable. (All fire or explosion incidents require at least Level II handling.)	Smoke only. No visible flame. Minor fire. Extinguished by facility personnel without specialized equipment or using only minimum equipment (e.g. hand extinguisher).	On-site fire response team responds (incipient phase only). Foam bladder tripped. Sprinkler system tripped. NOV or citation without a penalty.	City/County fire department or other external response ⁴ . NOV or citation resulting in a penalty.
RELEASE/SPILL	Managed in area. Leaking equipment/pipe for <1 minute. Visible emissions for <1 minute. No off-site impact. Clean-up costs <\$1,000.	Potential to affect waterways. Leaking equipment/pipe for >1 minute. Visible emissions for >1 minute. No offsite impact. Odor complaint received by agency directed toward facility (agency calls facility). Clean-up costs \$1,000 - \$25,000.	Affect Waterway. Reportable/Exceeds RQ. NOV or citation without a penalty. Permit allowable exceeded. Clean-up costs \$25,000 - \$100,000. Odor complaint received by agency directed toward facility (agency responds to site).	Affect waterway; uncontrolled. NOV or citation resulting in a penalty. Off-site response or clean-up. External involvement. Equipment or pipe failure resulting in release of all contents. Clean-up costs >\$100,000.
EQUIP/PROP	Costs <\$1,000.	Costs >\$1,000 but <\$25,000.	Costs >\$25,000 but <\$100,000. Stop Work.	Costs Stop Work. >\$100,000.
MOTOR VEHICLE ACCIDENT	Not applicable. (All MVA incidents require at least Level II handling.)	All vehicles involved traveling <12 mph. No injuries or First Aid only (CDLP, contractor or 3rd party). Animal strike with damage to vehicle while traveling <12 mph. No citation to CDLP driver.	Any vehicle traveling >12 mph. CDLP recordable injury. Contractor driver recordable injury. 3rd party injury requiring medical treatment beyond First Aid. Any vehicle is NOT drivable OR is NOT road-worthy. DOT Recordable. Animal strike with damage to vehicle while traveling >12 mph. NOV or citation to CDLP driver.	Rollover. Injury to 3rd party requiring hospital or lost work day. CDLP lost work day. Contractor driver lost work day. 3rd party, contractor, subcontractor or CDLP fatality. NOV or citation resulting in a penalty.
CLIENT	Observation of inadequate controls	Agency fines and enforcement that carry no or moderate financial penalty - Estimated Cost <\$500,000 Allegations of non-compliance by a third party e.g., lawsuit by private party or non-governmental organizations	Agency fines and enforcement actions that carry significant financial penalty. Estimated total cost >\$500,000 to \$3MM Stop Work.	Agency fines and enforcement actions that threaten company reputation and the ability to operate or carry significant financial penalty. Estimated total cost > \$3MM. Removal from jobsite.
REPUTATION	Incidents that attract no media attention and have no impact on company reputation.	Incidents that attract national media attention and may have moderate impact on company reputation.	Incidents that attract national media attention and may have moderate impact on company reputation.	Incidents that attract worldwide media attention and may have major impact on company reputation.

¹Any recurrence of an incident may justify review at a higher incident level.

²Near misses include but are not limited to those listed.

³Site Manager or designee is responsible for making notifications as soon as possible, but no later than the end of the shift on which the incident occurred. Immediate Contact.

⁴External response or involvement refers to regulators, sheriff/police, media, local responders, etc.



⁵The vehicle is NOT road-worthy if

- all safety, stability and control systems are not fully functional
- the vehicle must be towed (except for towing due to flat tire or similar)
- more than 50% of the vehicle's lights on the front or rear are non-functional

EQUIPMENT INVOLVED THAT CONTRIBUTED TO NEAR LOSS - Select all that apply

- ◆ 1. Air Stripper
- ◆ 2. API Separator
- ◆ 3. Automobile
- ◆ 4. Boom Material
- ◆ 5. Bulldozer
- ◆ 6. Cable
- ◆ 7. Carbon Drum / Vessel
- ◆ 8. Chain Block
- ◆ 9. Compressor, Air
- ◆ 10. Control Panel (local)
- ◆ 11. Crane (mobile)
- ◆ 12. Drill Rig
- ◆ 13. Drilling Equipment, Vacuum
- ◆ 14. Drum, Vertical
- ◆ 15. Dump Truck
- ◆ 16. Electric Heater
- ◆ 17. Electrical Power Supply
- ◆ 18. Engine, Internal Combustion
- ◆ 19. Equipment Safety Grounding
- ◆ 20. Excavator / Power Shovel
- ◆ 21. Exclusion Zone Equipment
- ◆ 22 Fan, Centrifugal / Blower
- ◆ 23 Fencing
- ◆ 24 Filter
- ◆ 25. Fire Extinguisher
- ◆ 26. Forklift
- ◆ 27. Front End Loader
- ◆ 28. Grader
- ◆ 29. Hand Tool, Hammer
- ◆ 30. Hand Tool, Knife
- ◆ 31. Hand Tool, Non-Powered
- ◆ 32. Hand Tool, Powered
- ◆ 33. Hand Tool, Powered, Drill
- ◆ 34. Hand Tool, Powered, Grinder
- ◆ 35. Hand Tool, Powered, Hydraulic Torque
- ◆ 36. Hand Tool, Powered, Saw
- ◆ 37. Hand Tool, Powered, Wrench, Impact
- ◆ 38. Hand Tool, Saw
- ◆ 39. Hand Tool, Screwdriver
- ◆ 40. Hand Tool, Shears
- ◆ 41. Hand Tool, Shovel
- ◆ 42. Hand Tool, Snip
- ◆ 43. Hand Tool, Wrench
- ◆ 44. Hoist
- ◆ 45. Hook/Clamp/Buckle, etc.
- ◆ 46. Jack
- ◆ 47. Ladder, Extension
- ◆ 48. Ladder, Platform
- ◆ 49. Ladder, Step
- ◆ 50. Lock / Tag
- ◆ 51. Maintenance Tool, General
- ◆ 52. Manifold
- ◆ 53. Manlift/Basket/Cherry Picker
- ◆ 54. Motor, Electric
- ◆ 55. Oxidizer
- ◆ 56. Pallet
- ◆ 57. Piping
- ◆ 58. Piping, Hose
- ◆ 59. Piping, Injection/Mixing Point
- ◆ 60. Powered Tools, Hydrojet
- ◆ 61. Pump, Centrifugal
- ◆ 62. Pump, Diaphragm
- ◆ 63. Pump, Reciprocating
- ◆ 64. Pump, Regenerative
- ◆ 65. Pump, Rotary
- ◆ 66. Pumps (transfer, electrical)
- ◆ 67. Pump, Submerged
- ◆ 68. PPE, Face Shield
- ◆ 69. PPE, Fall Protection
- ◆ 70. PPE, Gloves
- ◆ 71. PPE, Hard Hat / Helmet
- ◆ 72. PPE, Hearing Protection
- ◆ 73. PPE, Respiratory, Chemical
- ◆ 74. PPE, Respiratory, Particulate
- ◆ 75. PPE, Safety Glasses
- ◆ 76. PPE, Safety Goggles
- ◆ 77. PPE, Safety Shoes / Boots
- ◆ 78. PPE, Safety Vest / Clothing
- ◆ 79. Rope
- ◆ 80. Sampling Equipment, Bailer
- ◆ 81. Sampling Equipment, Geoprobe
- ◆ 82. Sampling Equipment, Hand Auger
- ◆ 83. Sampling Equipment, PID
- ◆ 84. Sampling Equipment, Sample Container
- ◆ 85. Sampling Equipment, Split Spoon Sampler
- ◆ 86. Sling
- ◆ 87. Snow Blower
- ◆ 88. Snow Plow
- ◆ 89. Space Heater, Electric
- ◆ 90. System, Air Sparing
- ◆ 91. System, Carbon Treatment
- ◆ 92. System, Chemical Oxidation
- ◆ 93. System, Dual Phase Product Recover
- ◆ 94. System, Groundwater Pump and Treat
- ◆ 95. System, POET
- ◆ 96. System, Shed or Trailer
- ◆ 97. System, Vapor Extraction
- ◆ 98. System, Vapor Phase Treatment
- ◆ 99. System, Other
- ◆ 100. Tank, Surge
- ◆ 101. Tank, Underground
- ◆ 102. Telemetry System
- ◆ 103. Testing Devices
- ◆ 104. Tractor Trailer
- ◆ 105. Truck, Flatbed
- ◆ 106. Truck, Pickup
- ◆ 107. Truck, Tank Truck
- ◆ 108. Truck, Vacuum
- ◆ 109. Valve, Safety
- ◆ 110. Valve, Block
- ◆ 111. Well, Extraction
- ◆ 112. Well, Monitoring
- ◆ 113. Well, Recovery
- ◆ 114. Winch
- ◆ 115. Wire Rope
- ◆ 116. No Equipment Involved
- ◆ 117. Not in List (describe): []

ROOT CAUSE NUMBER(S)
PERSONAL FACTORS:

- (1) LACK OF SKILL OR KNOWLEDGE
- (2) DOING THE JOB ACCORDING TO PROCEDURES OR ACCEPTABLE PRACTICES TAKES MORE TIME OR EFFORT
- (3) SHORT-CUTTING PROCEDURES OR ACCEPTABLE PRACTICES IS POSITIVELY REINFORCED OR TOLERATED
- (4) IN PAST, DID NOT FOLLOW PROCEDURES OR ACCEPTABLE PRACTICES AND NO INCIDENT OCCURRED
- (5) FAILURE TO MAKE SAFE/SECURE
- (6) IMPROPER LIFTING
- (7) FAILURE TO USE PPE PROPERLY
- (8) IMPROPER POSITION FOR TASK
- (9) INFLUENCE OF DRUGS/ALCOHOL
- (10) USING EQUIPMENT IMPROPERLY

JOB FACTORS:

- (11) LACK OF OR INADEQUATE PROCEDURES
- (12) INADEQUATE COMMUNICATION OF EXPECTATIONS REGARDING PROCEDURES OR ACCEPTABLE STANDARDS
- (13) INADEQUATE TOOLS OR EQUIPMENT (available, maintained, etc.)
- (14) SUBSTANDARD HOUSEKEEPING
- (15) NOISE EXPOSURE
- (16) RAIN/SNOW
- (17) HIGH OR LOW TEMP EXPOSURES
- (18) INADEQUATE VENTILATION
- (19) GROUND (ROCK) CONDITIONS
- (20) HAZARDOUS ENVIRONMENTAL CONDITIONS (GASES, DUST, SMOKE, FUMES, VAPORS)



ON SITE SAFETY BRIEFING TRACKING FORM

*Please ensure that all workers (including other contractors) attending the safety meeting, initial the column beside their name

ATTACHMENT 8
GOLDER ASSOCIATES HASP



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

1.0 CONTACTS LIST SUMMARY

1.1 Emergency Contacts

Contact	Number
Ambulance	911
Fire	911
Police	911
Golder National Health and Safety Leader (Jane Mills)	206-295-7002
WorkCare	888-449-7787

Hospital name	Address	Phone	Level of Care Available
Mercy Regional Medical Center	1010 Three Springs Blvd., Durango, CO 81301	970-247-4311	

1.2 Golder Contacts

	Name	Office Name	Office	Cell	Home
Project Manager	Diane Crawford	Redmond	+1 206 316-5521	+1 206 713-5878	
Project Director	David Banton	Redmond	+1 425 883-0777	+1 (425) 503 9331	
	Jen Pepe	Portland	+1 (503) 607-1820	+1 575 654-4889	
	Sara Harkins	Denver	303-980-0540	847-877-9734	

1.3 Missed Check-in Contacts

	Name	Phone	Cell
Project Manager	Diane Crawford	+1 206 316-5521	+1 206 713-5878
Project Director	David Banton	+1 425 883-0777	+1 (425) 503 9331

1.4 Client and Site Contacts

Nearest Golder office	USA - Denver
Phone	+1 (303) 980-0540
Fax	+1 (303) 985-2080
Email	

Role	Name	Number
Contact person on site	Pat Maley & Linda Schmoll	775-240-1288 (Pat), 303-493-1595 (Linda)
Client safety contact	See above	
Company Golder reports to	Kinross	
Company reporting to Golder	None	



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

Golder overall site supervisor and alternate:	Diane Crawford	Office: +1 206 316-5521 Cell: +1 206 713-5878

You have the right to refuse any work you feel is unsafe, or that you are not trained to do. Choose to work safely and in compliance with all HSE requirements.

2.0 PROJECT PROPOSAL DETAILS

Project/Proposal Number	1537306	Start Date	Jul 29, 2015	End Date	Dec 31, 2015
Project Title	OVERSIGHT OF EPA SAMPLING, SUNNYSIDE MINE, CO				
Client Name	Kinross Gold USA, Inc.				

Brief description of project and scope of works (include any hazardous activities, if known)

Golder will work with Kinross sample oversight teams, as assigned by Kinross, during USEPA's sampling event from August 4 through August 6, 2015. Our duties as oversight personnel are to monitor and document the sampling methodology and protocols utilized by USEPA personnel to ensure that the Standard Operating Procedures (SOPs) specified in the Quality Assurance Project Plan (QAPP) for this sampling event are followed (USEPA 2015). This will include collection of split samples from samples collected by USEPA, as directed by Kinross; and collection of unique samples (non-splits) from test pits and surface water, or other media as directed by Kinross.

Additional Comments

--

3.0 GOLDER TEAM

Name	Office	Contact number (cell phone)	Office Phone	Role
Diane Crawford	Redmond	+1 206 713-5878	+1 206 316-5521	
Jen Pepe	Portland	+1 575 654-4889	+1 (503) 607-1820	
Sara Harkins	Denver	847-877-9734	303-980-0540	

Project Manager (PM)

- Appoint a competent site supervisor and alternate. For sites with multiple Golder projects/disciplines at work, coordinate with the overall site supervisor
- Oversee/develop hazard controls including work instructions and
- Assign only adequately trained and competent employees to the project

Site Supervisor

- The site supervisor is responsible for the safety of all Golder employees, subcontractors, visitors and public on the parts of the site under Golder control.
- Communicate all site hazards to affected parties, in real time, as hazards, conditions and employees change.
- Ensure that work is undertaken in accordance with the hazard controls included in this HaSEP.

Contractor

- All plant and equipment is maintained in a safe working condition
- All plant and equipment are to be registered/licensed and electrical equipment tagged and tested
- Potential hazards are to be controlled (e.g., cage over rotating parts)
- You will report any identified hazards to the Golder Associates field staff member



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

Field Staff

- Inspect your worksite and equipment before starting work
- Apply the controls outlined in this HaSEP
- Look out for the safety of yourself and others
- Report unsafe acts, conditions and incidents to the site supervisor

4.0 CLIENT/SITE LOCATION DETAILS

4.1 Client/Site Location Details

Project location map (paste URL here)

4.1.1 Site Description

If the project is near another Golder Office, has the local Office been notified of the work? Yes No

Site Name			
Address	Various locations in Animas mining district outside of Silverton Colorado		
Coordinates			
Description			
Access info			
Previous land uses	Mine		
Site Receptors that maybe impacted by the proposed work			
Additional Info			
HSE Induction / orientation provider	<input type="checkbox"/> Golder	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Contractor
Site Contact Numbers	Field cell phone		<input checked="" type="checkbox"/> Satellite phone
	Other		
Nearest Golder office	USA - Denver	Address	44 Union Boulevard, Suite 300, Lakewood, Colorado, USA 80228
Opening days and hours		Email	
Phone	+1 (303) 980-0540	Fax	+1 (303) 985-2080
Google Maps			

5.0 CHECK-IN SYSTEM

5.1 Check-in contacts

	Primary	Secondary
Name	David Banton	
Phone/Email	+1 (425) 503 9331	
Check-in frequency*	Beginning and end of day	
By phone	<input type="checkbox"/> either	<input type="checkbox"/>
By email	<input type="checkbox"/> either	<input type="checkbox"/>
By SMS	<input type="checkbox"/> either	<input type="checkbox"/>



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

On site

5.2 Missed Check-in Procedure

Within 2 hours of missed check-in time:

1. Attempt to contact employee
2. Contact accommodation or other project personnel to determine last contact with employee
3. Notify Project Manager.
4. Project manager to determine timing of further action, based on project details.

Within 4 hours of scheduled call-in time:

1. Contact client and request assistance to locate employee.
2. Notify Project Director, Office Manager, and local authorities (as appropriate)
3. Initiate Crisis Response Plan (as appropriate)

Does missed check-in procedure for this project deviate from the standard procedure?

If yes, please provide details of project procedures.



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

6.0 RISK REGISTER

6.1 Risk Definition

Health & Safety Consequence or Impact Description:

Catastrophic	5	Death, toxic release off-site with detrimental effect, very high financial loss
Major	4	Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss
Moderate	3	Medical treatment required, on-site release contained with outside assistance, high financial loss
Minor	2	First aid treatment, on-site release immediately contained, limited financial loss
Insignificant	1	No injuries, low financial loss

Environmental Consequence or Impact Description:

Catastrophic	5	Release to air, water or land with life threatening impacts on or off site. e.g.: human death(s); destruction of endangered species; habitat destruction; human water supply or food destruction; localized extinction of a species; Protracted or extensive clean up requiring external resources.
Major	4	Release to air, water or land with destructive impacts on or off site. e.g.: destruction of animal /fish life; habitat damage; making air, water or land unfit for use by living things; destruction of known or unknown indigenous people's / heritage sites; irreversible alteration of the natural environment or its aesthetics; dust or noise affecting a region; large volumes of contaminated or hazardous waste. Requires clean up using external resources.
Significant	3	Release to air, water or land with impacts requiring long term recovery. e.g.: habitat disturbance; damage to indigenous people's/heritage sites; alteration of the natural environment or its aesthetics; generation of contaminated or hazardous waste, or large volumes of solid waste; dust or noise affecting the immediate area. Clean-up can be managed by internal resources.
Minor	2	Release to air, water or land with resulting in localised damage to worksite requiring short term recovery. e.g.: readily repairable impacts (physical or aesthetic) to the natural environment, indigenous people's/heritage items, property, or business operations; public nuisance (noise, dust, odours); generation of small quantities of waste. Clean up can be completed by internal resources.
Insignificant	1	Release to or disturbance of air, water or land resulting in no impact or localised (i.e. isolated to worksite) impacts within authorized limits. Short term impact with complete recovery. Clean up can be completed by person(s) involved.

Likelihood Description:

Almost certain	5	Incident will occur in every circumstance (e.g. every time).
Likely	4	Incident will probably occur (e.g. 1 in 10 times).
Possible	3	Incident may occur at sometime (e.g. 1 in 100 times).
Unlikely	2	Incident not expected to occur, but conceivable (e.g. 1 in 1,000 times).
Rare	1	Incident would only occur in exceptional circumstances (e.g. 1 in 10,000 times).

Risk Analysis Matrix:

Likelihood:		Consequence:				
		Catastrophic	Major	Moderate	Minor	Insignificant
Almost certain	5	25 (VH)	20	15	10	5
Likely	4	20	16 (H)	12	8	4
Possible	3	15	12	9 (M)	6	3
Unlikely	2	10	8	6	4 (L)	2
Rare	1	5	4	3	2	1 (VL)

0-3 (VL) Very Low Risk	No additional controls necessary. Continue to monitor risk.
4-6 (L) Low Risk	Consider additional controls to further reduce risk.
8-12 (M) Moderate Risk	Controls must be implemented to reduce risk.
15-16 (H) High Risk	Risk Unacceptable, do not proceed without controls, minimum of 'engineering controls'
19-25 (VH) Very High Risk	Risk Unacceptable, do not proceed without controls, elimination or substitution controls required



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

6.2 Risk Register

Header key:

<input type="checkbox"/> PA: Persons Affected	<input type="checkbox"/> RC: Residual Consequence
<input type="checkbox"/> IC: Initial Consequence	<input type="checkbox"/> RL: Residual Likelihood
<input type="checkbox"/> IL: Initial Likelihood	<input type="checkbox"/> RR: Residual Risk
<input type="checkbox"/> IR: Initial Risk	<input type="checkbox"/> AC: Additional controls

Risk Group	Initial Risk	Hazard	PA	IC	IL	IR	Controls	RC	RL	RR	AC
	See Client HASP for discussion of risks			0	0	0		0	0	0	



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

7.0 INCIDENT AND EMERGENCY MANAGEMENT

8.0 HSE PLAN CONTROL

It is the responsibility of the Project Manager to ensure that this HaSEP is prepared and the contents communicated at the pre-start / toolbox meeting to all project staff, Golder or subcontractor, with a copy held on site. The HaSEP has been reviewed or prepared by the Project Manager.

If the project site is remote from the home office, this HaSEP is to be reviewed and approved by the local Golder office whether in another country, province or city.

Role	Name (printed)	Date	Signature
Prepared by	Sara Harkins	7/30/2015	
Reviewed by	Diane Crawford	7/30/2015	
Approved by	Diane Crawford	7/30/2015	
Other			

8.1 Golder Sign-off

Signing below indicates you have read and agree to comply with the information contained in this document.

9.0



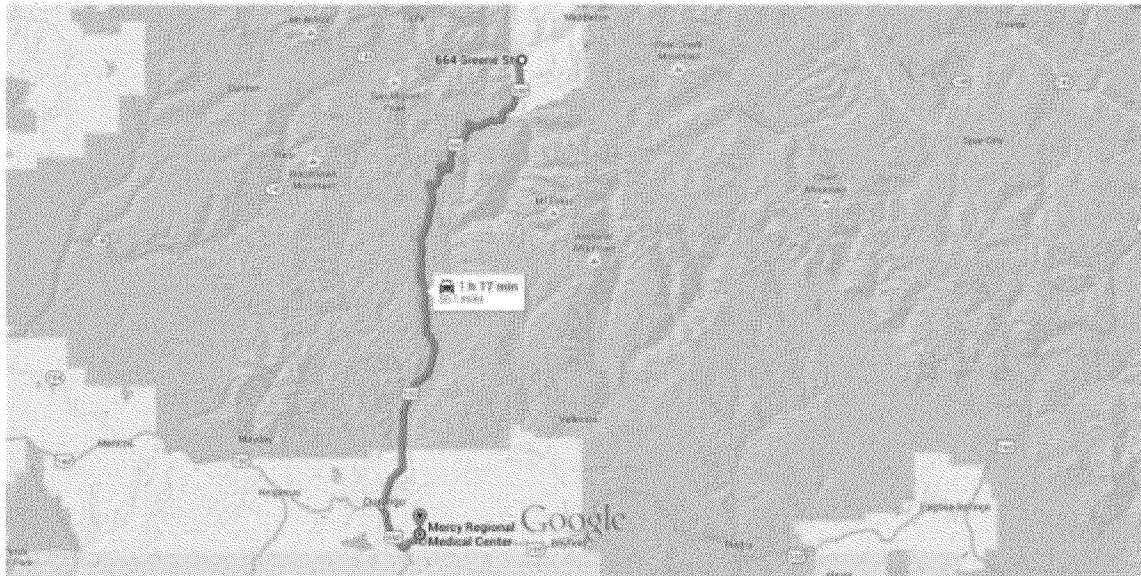
HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

10.0 DIRECTIONS TO NEAREST HOSPITAL



664 Greene St, Silverton, CO 81433 to
Mercy Regional Medical Center

Drive 55.1 miles, 1 h 17 min



664 Greene St Silverton, CO 81433

1. Head southeast toward Greene St

↑ 131 ft

2. Turn right onto State Hwy 110/Greene St

↗ Continue to follow State Hwy 110 0.2 mi

3. Merge onto US-550 S

↑ 48.1 mi

4. Continue straight onto US-160 E/US-550 S

↗ Continue to follow US-160 E 6.1 mi

5. Use the left 2 lanes to turn left onto Three Springs Blvd

↑ 0.5 mi

6. At the traffic circle, take the 2nd exit and stay on Three Springs Blvd

↗ Destination will be on the right 0.2 mi



HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

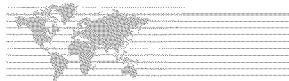


HEALTH AND SAFETY ENVIRONMENT PLAN (HASEP)

APPENDIX A

Written Work Procedures

- * HSE_200.012_SWP_Remote_Work-Working_Alone.pdf
- * HSE_200.027_SWP_Fitness_For_Duty.pdf



SWP Remote Work: Working Alone – GAI HSE 200.012

Approved by	Jane Mills	Issue Date	August 31, 2012
Revision by	Jane Mills	Revision Date	None

1.0 SCOPE

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) employees working alone or in remote and extremely remote locations. All of the requirements of this SWP become effective 30 days after the initial issue date.

1.1 Responsibilities

1.1.1 *Office Managers*

- * Assist Project Managers in the determination of applicability of this SWP to specific work sites.
- * Understand and make available the training specified in this SWP for employees assigned to work in extremely remote locations.
- * Understand and make available the Personal Protective Equipment (PPE) necessary to support employees working alone or in remote and extremely remote locations.
- * Prohibit employees unprepared through training, knowledge, and/or PPE from working alone, or in remote and extremely remote locations.

1.1.2 *Project Managers*

- * Evaluate project requirements to determine if they meet the definitions of working alone, remote location or extremely remote location, as presented in this SWP.
- * Check with all of the employees assigned to work alone, on remote, or extremely remote locations that they understand and meet the requirements of this SWP.

1.1.3 *Employees*

- * Employees planning to work alone or in remote locations must read, understand and follow the elements of this SWP.

2.0 DEFINITIONS

Extremely Remote Location	A work location where emergency services are not likely to attend to an injured or sick person in less than 1 hour from the time of the injury. Examples would include sites that require helicopter or boat access. "Extremely remote" locations are a subset of "remote" locations by definition.
Remote Location	A work location where emergency services are not likely to attend to an injured or sick person in less than 20 minutes from the time of the injury.
Working Alone	To work in circumstances where assistance is not readily available to an employee in the event of injury, ill health or emergency. No employee will be permitted to work alone in an extremely remote location. Working alone as the only Golder employee on a multi-employee worksite may be excluded from this definition of working alone.



3.0 KEY HAZARDS

Many hazards are associated with working alone or in remote locations. The hazards are categorized below as primary and secondary, designating the level of importance to our employee's health and safety.

1.1 Primary Hazards

- * Absence of definitive medical care. Working alone or in remote locations necessitates that our employees be prepared to manage injury care without assistance from medical professionals for some period of time. Preparation includes both training and carrying certain supplies into the field. See the GAI First Aid and CPR SWP for additional information.
- * Communication device reliability. Remote locations may be outside of cellular telephone range or under vegetation cover such that signals are not reliably transmitted. Difficult terrain can render GPS signaling devices useless. Prior to deployment, employees must check to see if they are carrying at least one, if not two, reliable communications devices (including spare batteries if necessary). These devices must be capable of transmitting a signal indicating the status of employee well-being. At no time can an employee work alone without a reliable communication device.
- * Development of inclement weather/environmental hazards. Employees must be prepared to shelter in place when working in remote locations for at least one day. Assessment of incoming weather conditions and the potential for environmental hazards such as avalanches must be part of pre-project planning, so that preparations can be adequate to stay warm, dry, and hydrated. See the GAI Inclement Weather SWP for additional information.

1.2 Secondary Hazards

- * Working in remote locations when means of transportation fails. If driving a vehicle (snowmobile, ATV, boat, truck or other non-standard motor vehicle) to a remote project site, employees must be prepared with fundamental repair equipment, vehicle fluids, and spare tires, as may be appropriate for the vehicle being used. See the GAI All Terrain Vehicles SWP, the GAI Helicopter Safety SWP, and/or the GAI Snowmobile Safety SWP for additional information.
- * Carrying heavy loads over long distances. Remote work often includes hiking great distances with equipment and supplies. It is important to balance the need for equipment and survival supplies with the increased weight and potential development of physical fatigue. Careful pre-trip planning will help the employee to identify all the necessities that are to be carried, and/or identify possible locations where supplies can be stockpiled (and not carried).
- * Contact with dangerous animals. While wildlife can be present in remote and non-remote work locations, employees working alone or in remote locations must be prepared for the dangerous animals in the areas where they will work, understand avoidance techniques and proper defensive postures for different animals, and be prepared to render care in the event of an injury or bite. In areas where poisonous snakes are present, employees must be able to recognize the snake and understand proper snake bite responses. See the GAI Biological Exposure Risks SWP for additional information.
- * Pre-existing medical conditions. Employees with conditions requiring medication must prepare for remote site work in such a way that they have adequate medication for at least one extra day. Employees working in teams are encouraged to share information about special medical conditions with each other.



- * Working at night. Emergency response time is expected to be longer for project work on remote sites in the dark. Scheduling work in daylight hours is strongly recommended.

4.0 TRAINING

Determination of appropriate training for remote site work or working alone should include consultation with the client to verify that training the Golder employee needs/has meets and/or exceeds any client requirements and the potential project hazards.

- * Hazard assessment through health and safety plan development. Work alone or in remote locations requires careful advance planning by employees who are experienced in this type of work. Employees must understand the hazards and appropriate controls for the specific location and task. Project Manager and Project Director approval of the hazard assessment is required.
- * First Aid \ CPR. All employees working in remote locations must be current in First Aid and CPR.
- * Wilderness First Aid (or equivalent). All employees working in extremely remote locations must be current in Wilderness First Aid (WFA) or an equivalent course of training. The approximate duration of such training is typically 16 hours. Resources for this training are below:

National Outdoor Leadership school
<http://www.nols.edu/wmi/courses/wildfirstaid.shtml>

Solo
<http://www.soloschools.com/index.cfm?event=course.wfa>

Remote Medical
<http://www.remotemedical.com/Wilderness-First-Aid-WFA>

Exceptions to this training requirement must be approved by the National Leader Health Safety and Environment.

- * Communication devices. Employees must be trained on the communications devices being used on the remote site. Examples of devices that require familiarization and training include client-provided radios, satellite phones, and SPOT satellite GPS units. Awareness must include information about spare power sources or solar battery chargers.
- * Navigation. All employees working alone or on remote sites must be competent in use of paper maps, compasses, and/or GPS devices to eliminate the possibility of becoming lost while on the project site.
- * Projects requiring helicopter access. For employees who have never done helicopter work, ask pilot to review basic helicopter safety procedures prior to take-off. See the GAI Helicopter Safety SWP for additional information.
- * Projects in locations where dangerous animals may be present. If employees are inexperienced with wildlife in remote locations, they should be paired with a more experienced employee. For example, in bear environments each employee should have the appropriate bear-aware training; able to recognize bear signs and knows what to do in the event they should meet a black/grizzly bear.



5.0 PRE-TASK PLANNING AND PREPARATION

The following list of planning steps is in order of priority, and each step should be considered when planning for work alone and/or in a remote location. The results (mitigation) for each should be clearly documented in the Health, Safety and Environment Plan (HASEP).

- * Determine if the project task meets the definition of working alone, or if the project location meets the definition of remote or extremely remote. Projects may change status from day to day depending on the work location or project activity.
- * **Identify the specific hazards** for the location where work is being conducted. Identify equipment and training necessary for work in that location.
- * Determine the type of **communication device** that will function in the location where Golder will be working. Determine the appropriate backup for device power supply. Familiarize all employees (Golder and subcontractors) with appropriate communications calls.
- * Develop a **communication plan**. Establish a check-in procedure that includes two check-in points during each day as a minimum. Check in every 2 hours is recommended for extremely remote work locations. Depending on factors such as the remoteness of the work site, site conditions, the nature of the work being done, and the duration of the work, the communication plan should include:
 - * Daily itinerary and work plan.
 - * Contact or check-in with a designated person at appropriate intervals.
 - * Contingency plans for missed check-in.
- * Prepare a **contact list** identifying important names and numbers (office, client, local logging camp or first aid location if possible, nearest hospital/clinic, etc.) for employees and the nearest Golder office. Where appropriate, share this contact list with the client.
- * Identify the exact location of closest definitive **medical care** that will support Golder's work location. Determine exactly how this medical care will be alerted in the case of an injury. Determine the estimated time between alert of an injury and actual response to the injured employee by emergency responders. This step may require communication with the emergency responders, and discussion of airlift capabilities.
- * Review the **weather forecast** for time and location of the remote work. Prepare equipment and supplies to survive an appropriate number of days if stranded by poor weather. As an example, helicopters may not be able to retrieve employees from remote locations if the weather is not suitable to fly safely.
- * Carry appropriate equipment to **shelter in place** for at least one day, depending on the circumstances of the work location. The list below provides suggestions for equipment.
 - * Shelter (tent, bivy).
 - * Sleeping bag.
 - * Stove, source of fuel.
 - * Water, food.
- * Determine an appropriate level of **first aid kit** to carry to the remote location. The contents of the kit will depend on the hazards presented by the location. For remote work, marine grade first aid kits are recommended because they are generally designed for remote use by multiple people. The first aid kit selected for a project will be determined



based on the number of people it is designed to support, and the geographic challenges of the work place.

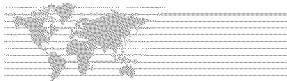
- * Obtain and carry good paper **maps of the work area** (scale 1:5000 or at least 1:50,000). Employees should have these maps prior to departure.
- * **Outfit all vehicles** with proper spare and repair parts and fluids including jacks, spare tires, and fuel. Prior to the vehicle use employees will need to know where to find the jack and how to change a tire.

6.0 CONTROL MEASURES

- * No employee will be permitted to work alone in an extremely remote location.
- * No Golder employees shall be permitted to work in extremely remote locations without communications devices and survival gear that are proven to be effective for that location. If Golder employees find that they have arrived in a location where their communication device does not work, they are to immediately backtrack and return to a location where a positive signal can be sent/received.
- * Applicable local regulations must be reviewed before work is performed alone. Some jurisdictions have broad scale regulations concerning working alone while others have regulations for engaging in specific activities, such as entering a confined space, alone.
- * If work involves a critical task, the work should not be conducted alone. Critical tasks may include any of the following. This list is not exhaustive:
 - * Confined space entry. See the GAI Confined Space Entry SWP for additional information.
 - * Working at heights requiring fall protection. See the GAI Fall Protection SWP for additional information.
 - * Entry into abandoned or derelict buildings (unless it is your only source of emergency shelter).
 - * Working on or over water where there is the risk of drowning. See the GAI Working On or Over the Water SWP or the GAI Cold Water Operations SWP for additional information.
 - * Using supplied-air breathing equipment. See the GAI Respiratory Protection Program or the GAI Respiratory Protection SWP for additional information.
- * Provide each employee with a paper map and each crew leader with a radio or other communication device (if necessary) and contact sheet. Employees shall be aware of overall project plan at the start of each day and have pre-determined areas where they will work (i.e., sections of road or cut block).
- * For work in extremely remote locales (helicopter access), stash emergency kit in a safe place (up in a tree) at the heli-pad. Perform radio checks with the helicopter when it is in range (have pilot circle study area and establish radio contact before he leaves for the day).

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) AND EQUIPMENT

Specialty equipment required for work in remote locations will be identified within the project HASEP. Determination of appropriate PPE should include consultation with the client to verify that the Golder

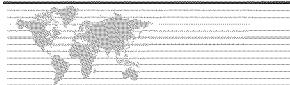


employee's PPE either meets and/or exceeds client requirements or project hazards. Specialty PPE for remote site work may include:

- * Boots appropriate for the environment.
- * Clothing that provides skin protection appropriate to the environment (e.g. long sleeve shirt, long pants).
- * Safety glasses.
- * Head protection appropriate for the environment.
- * High visibility vest.
- * Comprehensive first aid kit (as defined in Pre-Task Planning and Preparation section above).
- * Emergency survival kit that may include an emergency whistle and signal mirror.
- * Water, food, shelter, source of fire.
- * Cell phones, radios, satellite phones and/or SPOT locator devices for communications while on the project site.
- * Beacon locator and/or flares (in extremely remote locations).

8.0 RELATED GOLDER DOCUMENTS

- * GAI HSE 200.003 SWP Biological Exposure Risk.
- * GAI HSE 200.005 SWP Confined Space.
- * GAI HSE 200.007 SWP Inclement Weather.
- * GAI HSE 200.013 SWP Respiratory Protection.
- * GAI HSE 200.025 SWP Working On or Over the Water.
- * GAI HSE 200.028 SWP All Terrain Vehicles.
- * GAI HSE 200.029 SWP Helicopter Safety.
- * GAI HSE 200.031 SWP Cold Water Operations.
- * GAI HSE 200.033 SWP Fall Protection.
- * GAI HSE 200.040 SWP First Aid and CPR.
- * GAI HSE 200.043 SWP Snowmobile Safety.
- * GAI HSE 202 Respiratory Protection Program.



SWP FITNESS FOR DUTY – GAI HSE 200.027

Approved by	Jane Mills	Issue Date	December 10, 2009
Revision by	Brian Tuccillo	Revision Date	April 4, 2014

1.0 INTRODUCTION

This Standard Work Procedure (SWP) applies to all Golder Associates Inc. (Golder) employees and contractors to evaluate if they are fit for duty. This SWP follows the minimum standards set forth in Golder's Global Procedure 6 (GP 6) Management of Health and Safety.

2.0 DEFINITIONS

Company-Related Business – Any act performed by a Golder employee within the scope of the employee's duties. Generally, operating one's personal vehicle from home to work and/or from work to home does not constitute company -related business. However, this travel time is included in the calculation of working hours for fatigue management purposes.

Downtime - Work Break – Non-work periods within a work day allowing time for eating, drinking and relaxation. **Rest Period** – Non-work periods outside of the 12 hour work day.

Emergency Situation – Where life and/or property are in danger of immediate harm.

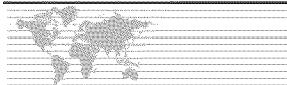
Fit for Duty/Fitness for Duty – Physically, mentally and emotionally able to perform all assigned duties and in a manner which does not compromise or threaten the safety and health of themselves or others while preserving the integrity of property and the environment. An individual may be unfit for duty for a variety of reasons, including the adverse effects of fatigue, alcohol or drug use , or a range of physical, psychological or emotional limitations.

Fatigue – Physical, mental or emotional exhaustion resulting from a number of causes including, but not limited to, work, physical, mental or emotional exertion, lack of sleep, various stressors, or a combination of these factors.

Fatigue Leave – Time off to be taken immediately after completing 14 consecutive 12 hour days or at the end of the scheduled shift rotation if longer.

Golder's Contractor – A third-party retained by Golder to perform services at any location where Golder employees are engaged in company -related business. The term contractor includes all sub -consultants and subcontractors and their employees. A contractor representative is the person responsible for directing, controlling and/or supervising the contractors who perform or provide contractor services.

Standard Working Day/Shift – Working up to 12 hours including travel time , for fatigue management purposes.



Sufficient Rest – Rest period is the time away from work when an employee has the opportunity to eat, relax and sleep. Sufficient rest period is typically a period of between 8 and 10 hours between the time work is ceased and returning to work. In some instances travel can be considered as a rest period, providing the employee can ensure effective sleep during the time of travel.

Supervisor – For the purposes of this SWP, a Supervisor is the person who reviews an employee's weekly time record and has the authority to direct their work schedule, among other responsibilities.

Work Hours – Work Hours - A maximum of 12 hours worked per day. Shift Rotation - A maximum of 14 consecutive 12 hour days without two days off of fatigue leave.

3.0 GOLDER'S RESPONSIBILITIES UNDER THIS SWP

Golder is responsible for implementing and enforcing this SWP. The responsibilities for Golder employees in their different roles are detailed below:

3.1 Operations Manager

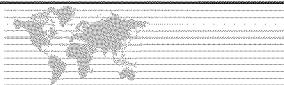
It is the responsibility of the **Operations Manager** to:

- * Communicate the fitness for duty SWP to employees and refresh with annual training as appropriate to ensure that all employees are familiar with the SWP and with their duties and responsibilities under the SWP.
- * Inform Golder employees of situations that might affect their fitness for duty through education sessions and during project planning.
- * Provide training to supervisors who review timesheets in appropriate response measures for employees with excessive weekly hours.
- * Determine who is fit for duty under this SWP, and respond as appropriate to employees who are unfit for duty.
- * Conduct a risk assessment with affected employees for office work when required by this SWP.
- * Review and, when appropriate, approve task-specific risk assessments for office assignments.
- * Discipline violations of this SWP in accordance with Section 9 of this SWP.

3.2 Supervisor

It is the responsibility of the **Supervisor** to:

- * Review employee weekly timecards and evaluate compliance with this SWP.
- * If deviations from the SWP (relative to hours worked) are noted, contact the employee to discuss the deviations, and make immediate corrections, as necessary, involving the Project Director (when applicable).



3.3 Project Director

It is the responsibility of the **Project Director** to:

- * Consider the requirements of this SWP when determining work shifts.
- * Review and, if appropriate, approve task-specific risk assessments for field assignments.

3.4 Project Manager

It is the responsibility of the **Project Manager** to:

- * Advise employees and contractors of situations that may impact their safety at their worksite through hazard analysis conducted during project planning (HASEP).
- * Inform Golder employees of situations that may affect their fitness for duty through education sessions and during project planning.
- * Provide a copy of this SWP to the contractor representatives.
- * Conduct a risk assessment with affected employees for field work when required by this SWP.
- * Respond as appropriate to employees who are unfit for duty.
- * Provide a copy of this SWP to the contractor representatives.

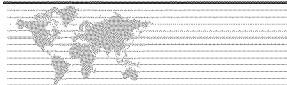
3.5 Human Resources Representative

It is the responsibility of the **Human Resources Representative (HRR)** to:

- * Respond to confidential fitness for duty inquiries from employees.
- * Communicate, as necessary, with Project Managers or Supervisors on behalf of the employee.
- * Understand federal, state and/or local laws as they may relate to work hours.

4.0 EMPLOYEE RESPONSIBILITY UNDER THIS SWP

- * Arrive at work each day fit for duty.
- * Comply at all times with Golder's Code of Conduct, employee handbook, all Golder policies, procedures, and safe work practices.
- * Notify your HRR, your supervisor, or any designated company representative immediately if:
 - * You have any doubts or concerns about your fitness for duty, or about your ability to safely perform your assigned responsibilities.
 - * For any reason, you become unfit for duty during the course of the workday.
 - * You observe another employee or Golder contractor who might appear to be unfit for duty.
 - * You observe another employee or Golder contractor engaging in unsafe behavior.
 - * You believe the work you are assigned to perform is unsafe, or if you feel you are not adequately trained to safely perform any of your assigned responsibilities.
 - * You are using drugs, alcohol, and other substances that might impair your fitness for duty.



- * Schedule sufficient rest (as defined in Section 8.3) before arriving at work.
- * Ensure non-work activities allow for sufficient rest.
- * Ensure illnesses that might affect your fitness for duty are managed.
- * Refrain from using drugs, alcohol, and other substances that might impair your fitness for duty.

5.0 FACTORS THAT CAN AFFECT AN INDIVIDUAL'S FITNESS FOR DUTY

A number of factors can affect an individual's fitness for duty. Among the most common factors are fatigue, temporary physical or psychological conditions, alcohol consumption, and the use of prescription medication and illegal drugs and substances. Many symptoms are commonly associated with fatigue. Because these symptoms might not be recognized by the fatigued employee, it is important for all employees to watch for symptoms of fatigue in each other during long work shifts.

6.0 KEY HAZARDS

Employees who are unfit for duty have a significantly higher risk than others do of suffering a serious injury or death, causing serious injury or death to others, and committing mistakes in performing their job responsibilities. Individuals who are unfit for duty:

- * Tend to overestimate their ability to perform tasks safely, underestimate potential hazards in the workplace, and often disregard the use of appropriate personal protective equipment.
- * Tend to be less efficient, less productive, and more prone to making technical errors.

7.0 WORK HOURS

Golder acknowledges flexible working hours might be required to ensure business continuity and delivery of client service. Golder has established the following work hour limits that all employees must adhere to, and all employees must follow when establishing work schedules:

All activities at Golder should be designed to fit into the standard working day of 12 hours (including travel time). In addition, all activities at Golder should be designed and managed so that no employee works more than fourteen consecutive 12-hour days without experiencing two days of fatigue leave.

The standard working-day guidelines rely on each employee to monitor their own fitness for duty in preparation for work periods of up to 12 hours in duration.

If under extreme or unforeseen circumstances a project or office activity requires an extended working day (greater than 12 hours), a project-specific or activity-specific fatigue risk assessment (Section 8) must be conducted and permission must be obtained from either the Project Director or Operations Manager. If



permission to work in excess of 12 hours is granted, the following minimum control measures must be implemented:

- * A “buddy” system so the employees are not working the extended work day alone. Work at home or in a hotel room after the extended work day represents a lower safety risk, because driving while fatigued is eliminated.
- * The Project Director (for field work) or Supervisor (for office work) and the affected employees shall identify factors that might impact the employees’ ability to work safely beyond the standard working day. During this consultation, the employees must notify the Project Manager and supervisor of any personal or other matters that might affect their fitness for duty or their ability to safely work the extended hours.

If international or remote site work requires employees to be onsite for greater than the two -week period, a project-specific or activity-specific risk assessment must be conducted, and permission for the extended (>14 days) rotation is required from either the Project Director (for field work) or the Operations Manager (for office work). If permission is granted, the following minimum control measures must be implemented:

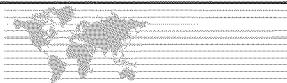
- * All effort must be made to ensure breaks are taken during the work period so that 14 consecutive 12-hour days in a row are not exceeded.
- * The working plan must allow for flexibility in work hours such as half-day breaks for rest.
- * During downtime in operation (such as equipment breakdowns), employees must be given the opportunity to rest.

A modified standard working day might be established based on environmental factors and the specific nature of the work to be performed. These factors include, for example, extreme weather conditions, remoteness, and degree of the physical exertion required.

Work schedules for projects involving employees from multiple operating companies must be defined in advance of employee deployment to the site. GAI employees will only be deployed to a project site where compliance with this SWP is assured. A GAI employee working for another Golder operating company would still need to follow GAI’s Fitness For Duty SWP (this document), if the other Golder operating company’s Fitness For Duty requirements are less stringent.

7.1 Compliance With Federal, State and Local Laws Governing Working Hours

Certain federal, state and/or local laws or client requirements can impose specific requirements with respect to the maximum number of hours an employee is permitted to work at any one time. Golder will comply with applicable laws governing working hours (MSHA and DOT, where applicable) or client requirements. Any questions regarding these laws or client requirements should be directed to your HRR or Project Manager as appropriate.



8.0 FATIGUE RISK ASSESSMENT

If operational requirements necessitate staff exceeding the work-hour guidelines, a risk assessment shall be conducted that can demonstrate all risks are adequately controlled. The risk assessment process is detailed in the toolkit associated with this SWP.

8.1 Fatigue Risk Assessments for Field Work

The risk assessment must be conducted by the employee and the Project Manager for work outside of the office. The risk assessment must be documented on the form provided in the toolkit associated with this SWP. Work cannot proceed until this risk assessment has been reviewed and authorized by the Project Director or Operations Manager. Work schedules/activities to minimize risks associated with fatigue will be incorporated into the project HASEP as identified through the risk assessment process.

8.2 Fatigue Risk Assessments for Office Work

The risk assessment must be conducted by the employee and the employee's supervisor for office work whether conducted at the office or at a remote location like a hotel. This assessment can take the form of a conversation that includes the elements defined in the toolkit associated with this SWP.

8.3 Breaks

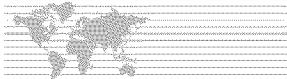
Breaks are an important part of managing fatigue. Time spent away from work allows individuals to recover from mental and physical fatigue and improve safety, work performance, efficiency. Factors such as the physical demands of the task or weather conditions must be considered.

Consistent with applicable federal, state or local laws, breaks during a standard working day should be adequate and regular. Rest during your lunch break. At other times this could be as simple as taking a break while demobilizing from a project site. There should be a minimum of one 30-minute break in each 8-hour work period.

As a guide, the amount of sleep required in the previous 48-hours needs to be no less than the length of the next intended work period. For example, if you plan to work 12 hours in any given day, you need to have had at least 12 hours sleep over the previous 48-hours.

For extended working days/shifts:

- * If an employee has worked at least 12 hours (excluding breaks), the employee must rest for at least 8 hours before returning to work.
- * On rare occasions when an employee has worked more than 12 hours, the employee is required to rest for at least 10 hours before returning to work.



8.4 Travel/Transport

- * When an employee has worked consecutively for 14 hours or more in a single day they shall not operate a vehicle. Arrangements must be made, not at the employee's expense, for alternative transportation or accommodations. In unforeseen situations, an employee may complete their journey without being in violation of the provisions of this procedure, provided the planned journey could reasonably have been completed within the provisions of this procedure in the absence of the unforeseen situation.

9.0 COMPLIANCE

All individuals are required to comply with this SWP. For employees, failure to comply with this SWP will result in disciplinary action up to, and including termination of employment. Contractors who fail to comply with this SWP can be removed from the worksite or prohibited from engaging in any further Company – Related Business. Supervisors, Project Managers or Project Directors who chronically fail to ensure their staff follow the SWP are subject to disciplinary action up to, and including termination of employment.

10.0 GOLDER RELATED DOCUMENTS

- * GP-6 Management of Health and Safety
- * Golder's Code of Conduct
- * Golder's Employee Handbook

